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COMMENT(S)

FOLDER M-64

Lab Reports

147501

60-40 %

R7K-120

VMP - 15.5
LD - 23.6
Xylol - 6.9
Tol - 6.4
IPA - 4.3
IBA 8.4
acet - 18.5
MEK - 7.4
2 Ethoxyl acet - 3

Sol

Sherwin Wms
R7K-120
Tech Lab
566 2836
2935
Al Samatis

Heil - 1960

1956 Trailmobile

44E10

80/B14

Sp. Gr. .744 gal/6.25

BR-245-287

Area

M.S.—

Solvesso 100

Hi Sol.

Butyl Cellosolve

Area Specs on V.M.+P

Fl Pt 55

KB-36-41

Code #

BR 150cc Arco .778

I.B.P. - 220 ? Sp. Gr. .77

10% - 290

20 - 300

50 - 330

70 - 340 - cut

90 - 370

cut should probably be at about 50% - or sooner (310-320)

don't exceed .750 S.G.

Quality Control

Mr. Jordan

Clare Mi 11170

Kerosene

Memo

4-7-67

As per your request please find attached lab report on your sample of reclaimed napahtha. It is not for our use here.

N J Warner

Three

RESEARCH AND DEVELOPMENT WORK SHEET

Charge to: LAB. Date 4-5-67

Subject: SAMPLE RE-CLAIM NAPHTHA "OBITS"

Conclusion: DATED 4-4-67

Test Results:

API = 32.9
PPG = 7.167
SG/60 = .8607
FLASH - 48°

IBP = 172 MEK
5 = 212 10%
10 = 225
20 = 232 Tol
30 = 240 60%
50 = 246
70 = 256 XYLOL
90 = 280 30%
DP = 312
EP = 315
REC = 97.0%

Date Reported 4-5-67 Reported by R Joe Tinkle

arco

Sp Gr. .846

Dry Sol,

R-acid Sol-18 Sol H_2O-

Glenna

Sp. Gr. .856

Dry-Sol

L-acid Sol-36 Sol H_2O-8%

(Uniform Domestic Straight Bill of Lading. Adopted by Carriers in Official, Southern, Western and Illinois Classification territories, Mar. 15, 1922, as amended Aug. 1, 1930, and June 15, 1941.)

UNIFORM STRAIGHT BILL OF LADING

Original—Not Negotiable—Domestic

Shipper's No. .....

..... Company

Agent's No. .....

RECEIVED, subject to the classification and tariffs in effect on the date of issue of this Bill of Lading.

AT ELYRIA, OHIO. Jan. 14 19 71 FROM **THE OBITTS CHEMICAL CO., INC.**

Consigned to Battell Memorial Institute

Destination 505 King Avenue ~~Street~~, City, Columbus

off Olentangy River Road County, Ohio State

Delivering Carrier .....

..... Street ..... City ..... State

No. Packages	Description of Articles, Special Marks, and Exceptions	WEIGHT (Subject to Correction)	Class or Rate	Check Column
4	Dr. Sludge			
	Attention: Mr. Teuksbury			

If charges are to be prepaid, write or stamp here, "To be Prepaid."

Ppd.

$ .....

per

THE OBITTS CHEMICAL CO., SHIPPER

Per CMT

Permanent address of shipper: Elyria, Ohio.

..... Consignee.

Per .....

(Uniform Domestic Straight Bill of Lading, Adopted by Carriers in Official, Southern, Western and Illinois Classification territories, Mar. 15, 1922, as amended Aug. 1, 1930, and June 15, 1941.)

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Shipper's No. .....

..... Company

Agent's No. .....

RECEIVED, subject to the classification and tariffs in effect on the date of issue of this Bill of Lading.

AT ELYRIA, OHIO. Jan. 14 19 71 FROM **THE OBITTS CHEMICAL CO., INC.**

Consigned to Battell Memorial Institute

Destination 505 King Avenue Street, City, Columbus

or Olentangy River Road County, Ohio State

Delivering Carrier .....

..... Street ..... City ..... State

No. Packages	Description of Articles, Special Marks, and Exceptions	WEIGHT (Subject to Correction)	Class or Rate	Check Column
1	Dr. Sludge			
	Attention: Mr. Tewksbury			
1				

per

If charges are to be prepaid, write or stamp here, "To be Prepaid."

Ppd.

$ .....

THE OBITTS CHEMICAL CO., SHIPPER

Per CMT

Permanent address of shipper: Elyria, Ohio.

..... Consignee.

Per .....

MW 40

Lactol Spirits – 25% by vol	
Toluol	35
Amyl Acetate	15
Butyl Acetate	4
Propyl Acetate	4
Butyl Alcohol	4
Isopropyl Acetate	5
Isopropyl Alcohol Anhyd.	8

Marsh Metall Prod

Plastic Kote Medium

P. K. Acetone

Mix. 135°-141° Yield - 95% +

no cloud with total min spts (dry)

Sp. Gr.
.793 - @ 25°

slightly opaque with water

100% sol in 80% H_2SO_4

Thinner - over 50% solids - too dirty

Du Pont Wilmington

Lab Chestnut Run

Dr. J. Lundquist

A.C.
302 999-3058

~~Dr. John Lundquist~~

Dr. Tom Londrigan

USE OF DIRECT COLOR TITRATION IN AIR SAMPLING

D. DeWitt Huffman

Industrial Commission of Ohio

Many times an industrial hygienist is called to a plant to sample for a specific air contaminant. When he arrives he finds a different contaminant, or that the problem is misstated. For example, he may have been called in to measure chlorine only to find the contaminant is hydrogen chloride. He may also find that the problem that prompted the visit is not the main problem at all.

Obviously an industrial hygienist cannot go prepared to sample all plants for all things. He would be burdened with an unmanageable amount of equipment and tubes. The answer is to have one piece of equipment or kit with which he can make a number of tests.

Numerous examples could be given on the use of such a kit. A few may be of interest. On his first attempt it took an industrial hygienist three days to survey for sulfuric acid mist in a pickling operation in a major steel plant. This involved boiling solutions to eliminate CO_2, taking tests, boiling samples, back titrating, checking pH, and running back and forth between the plant laboratory and plant. Using direct color titration the same work would have been done in an easy half day.

On a hot summer day a plant, pickling steel with sulfuric acid, was visited. The mist was so bad that one industrial hygienist could hardly wait until he crossed the street, removed his shirt and literally took a sponge bath in a public fountain. The sulfuric mist concentration was 50 milligrams per cubic meter of air (50 times the TLV). It took only 24 seconds to make the test. In this case all that was needed was a figure and a word to the wise.

These and other field determinations can be made by bubbling the air to be sampled through a solution containing an indicator. (1) The only equipment needed is a midget impinger tube, a pump, a pipet, distilled water, a weak acid, a weak alkali, some indicators and dry chemicals. The whole kit can fit under an airplane seat. To make a determination of an acid gas such as hydrogen chloride, it is only necessary to bubble the air to be sampled through 10 ml of distilled water to which 2 drops of Fleisher's methyl purple indicator has been added. (2)

The time it takes to change the color of the indicator from green to purple is a measure of the concentration. If air is sampled at the rate of 0.1 gram molecular volume per minute (0.09 cubic feet per minute) and a color change occurs in 10 minutes, there is approximately one part per million of hydrogen chloride in the air.

The basic calculation is:

1 Gram-molecular volume (GMV) HCl = 1,000 ml 1.0 N HCl
1,000,000 ppm (1 GMV) HCl = 1,000 ml 1.0 N HCl
1 ppm HCl = 1,000 ml .000,001 N HCl
1 ppm HCl = 1.0 ml 0.001 N HCl

The calculation is based on the premise that it takes 1.0 ml of .001 N HCl to change the color of the indicator from green to purple or the pH from 7.0 to 5.3. In event it requires more or less than 1.0 ml of the acid, the figure obtained should be multiplied by that number of ml, 0.8 for example.

For times other than 10 minutes the following formulas may be used:

$$\text{ppm} = \frac{10}{\text{number of minutes}}$$

or

$$\text{ppm} = \frac{10 \times 60}{\text{number of seconds}}$$

If the acid in the air is very strong and the time required to change the color of the indicator is too short to be timed accurately, 10 ml of .001 N NaOH may be used instead of distilled water and the final result multiplied by ten.

The TLV for many substances is given in milligrams per cubic meter instead of parts per million. Parts per million may be readily converted to milligrams per cubic meter by multiplying by the proper factor. The factor is calculated as follows:

$$\text{mg/m}^3 = \frac{\text{ppm}}{24.5} \times \frac{\text{molecular weight}}{\text{valence of the chemical}}$$

For HCl it is

$$\frac{1}{24.5} \times \frac{36.46}{1} = 1.49 \text{ mg/m}^3$$

For $H_2 SO_4$ it is

$$\frac{1}{24.5} \times \frac{98}{2} = 2.0 \text{ mg/m}^3$$

For $Cr O_3$ it is

$$\frac{1}{24.5} \times \frac{100.01}{3} = 1.36 \text{ mg/m}^3$$

Alkalis may be determined in the same manner by putting 9 or 10 ml of water in an impinger tube, adding enough .001 N HCl (about 0.8 ml) to reach the end-point, then an excess of 1.0 ml.

In addition to measuring the flow of air with a rotameter, an impinger pump may be used where the flow of air is based on a vacuum of twelve inches of water. In this case a correction factor of $\frac{24.5}{28.3}$ or 0.9 may be used. Also, a vacuum of 10 inches of water may be used with no correction factor.

Inasmuch as the solutions used are very weak, absorbed acid or alkali on the surface of the glass of an impinger tube may influence the results. For that reason the tubes should be washed with a neutral material, such as pumice, and not by a strong acid or alkali. It is a good idea to let distilled water stand in the tubes for two hours or more before taking a sample and then use fresh water. Also, after a sample has been taken, particularly if it is a

strong acid or alkali, the impinger tube should be thoroughly rinsed with distilled water. Impingers for gas titration should be prepared in an area other than where the sample is to be taken. Exposure of the wet inner tube of the impinger to the air may cause the indicator to change color before a test is started.

Carbon dioxide does not appear to interfere. That is probably because the distilled water is in equilibrium with the carbon dioxide in the air and bubbling air through the water does not add to or remove the carbon dioxide.

The following figures may be of interest:

pH of distilled water.	6.8 - 7.8
pH of water after CO_2 from breath had been blown through water in midget impinger long enough to change methyl purple from green to purple.	5.1
pH of same sample after air has been bubbled through water five minutes and indicator had changed back to green.	6.9 - 7.9
pH of water after enough HCl had been added to change the indicator gray.	5.3
pH of boiled distilled water.	7.5

According to Fleisher's literature:

Green color	pH 5.4 and above
Gray color	In between pH 4.9 - 5.3
Purple color	pH 4.8 and below

It took 0.7 ml of .001 N HCl to change the indicator in 10 ml of distilled water to gray regardless of whether air had been bubbled through the water or not. (The CO_2 content of the air in the room was 700 ppm.)

In the determination of acetic acid (3) by a similar method Miller and others used a glycerol-water solution with which carbon dioxide did not interfere. In the same article they state that "No difference in efficiency was found between gas washing bottles equipped with fritted glass cylinders or bottles having an impinger type nozzle."

This method was first used August 14, 1951, to determine chlorine in the air using a modification of the iodide-thiosulfate method described by Jacobs (4). A midget impinger was used for sampling. Before the test was made, two impingers were connected in series and the second in the series had thiosulfate solution one-tenth as strong as the first. Inasmuch as the reaction was completed in the first tube before a color change took place in the second tube, it was concluded that the method was at least 90% efficient.

In commenting on this method of sampling, Patty (5) stated "although not entirely satisfactory for research work, and for the setting of standards of maximum permissible concentration, these methods are particularly useful in informing the industrial hygienists in the field - of the order of intensity of contamination, and therefore, whether control is necessary, and if so, to what extent."

Because oxides of nitrogen are not readily absorbed in water, this method cannot be successfully used in the determination of those gases. This may be significant in the measurement of ozone from welding.

It may be used to determine chromic acid in which case 0.74 ml of .0001 N thiosulfate equals 0.1 milligrams of CrO_3 per cubic meter of air when a sample is taken for ten minutes. However, a more practical way to determine CrO_3 is to use stabilized diphenyl carbizide as an indicator as outlined in the accompanying table.

It may also be used to determine ozone, sodium or potassium cyanide, sulfur dioxide, (6), hydrogen sulfide and other contaminants. White (7) has described a similar procedure for determining hydrogen cyanide.

One time it was necessary to determine hydrogen fluoride in the presence of sulfur dioxide. A tee connection was made and an acid titration was carried on in one impinger while a reduction reaction was carried on in the other. The difference between the two gave the amount of hydrogen fluoride.

To keep the KI solution from decomposing, it is well to add a granular layer of KI crystals about 3mm thick to the impinger tube rather than using a KI solution. Approximately one-tenth gram thyodene, as a powder, (Fisher Scientific Company) may be used instead of starch.

For determining ozone and probably CrO_3, the technique described by Jacobs (8) should probably be used. He states that the sensitivity of the method may be increased by adding a buffer solution of $AlCl_3.6H_2O$.

SUGGESTED NORMALITIES OF SOLUTIONS AND SAMPLING TIMES

CONTAMINANT	IMPINGER SOLUTION	INDICATOR	THRESHOLD LIMIT VALUE	TIME FOR TLV
HCl	H_2O (only)	methyl purple	5 ppm	2 min.
HF	H_2O (only)	methyl purple	3 ppm	3.3 min.
Acetic acid	H_2O (only)	methyl purple	10 ppm	1 min.
NH_3	H_2O + 1.0 ml .001 N HCl	methyl purple	50 ppm	12 sec.
H_2SO_4	H_2O (only)	methyl purple	1 mg/m^3	20 min.
Cr O_3	H_2O + .74 ml .0001 N $Na_2S_2O_3$ + KI	starch or Thyodene	0.1 mg/m^3	10 min.
Cl_2	H_2O + 1.0 ml .0002 N $Na_2S_2O_3$ + KI	starch or Thyodene	1 ppm	1 min.
O_3	H_2O + 1.0 ml .0001 N $Na_2S_2O_3$ + KI	starch or Thyodene	0.1 ppm	10 min.
SO_2	H_2O (only)	methyl purple	5 ppm	1 min.
SO_2	H_2O + 1.0 ml .001 N iodine + KI	starch or Thyodene	5 ppm	1 min.
H_2S	H_2O + 1.0 ml .001 N iodine + KI	starch or Thyodene	20 ppm	15 sec.
KCN	H_2O + .94 ml .001 N HCl	methyl purple	5 mg/m^3 as CN	2 min.
NaCN	H_2O + .94 ml .001 N HCl	methyl purple	5 mg/m^3 as CN	2 min.
NAOH	H_2O + .61 ml .001 N HCl	methyl purple	2 mg/m^3	5 min.
$FeCl_3$	H_2O (only)	methyl purple	1 mg/m^3 as Fe	7.6 min.
Alternate method for				
Cr O_3	H_2O (only)	stabilized diphenyl carbizide (.1 gm/10 cc)	0.1 mg/m^3	5 min. (for first color)

This method has the following advantages:

1. The materials used are simple and inexpensive.

2. If the industrial hygienist does not have the solutions with him, he can prepare them at a plant being visited, if that plant has a laboratory, or go to a plant in the territory having a laboratory and get them there.

3. The results are quickly calculated at the time of the visit.

4. The reactions that take place are very simple and can be understood by most observers. That way they seem to have more confidence in the results.

5. Possibility of error is reduced because it is not necessary to transfer solutions from one container to another. Also calculations are automatic.

6. Loss of solution by "carry-over" affects the results a minimum because there is no back titration.

7. Most of the solutions can be carried in polyethylene bottles and freezing will not affect them.

The same precautions should be taken as in taking samples by other methods. For example, in one location near a steel mill there seemed to be more alkali in the air than sulfuric acid mist at an exhausted pickling tank where a sample was being taken.

In their work on acetic acid Miller (3) and others have reported a high degree of accuracy by a similar procedure. The method outlined in this paper is a convenient tool in the field of industrial hygiene for rapid field work.

References:

(1) Gisclard, J. B.; Rook, J. H.; Andresen, W. V.; and Bradley, W. R., A Simple Device for Air Analysis, American Industrial Hygiene Quarterly 14:1, 1953.

(2) Fleisher Chemical Company, Benjamin Franklin Station, Washington 4, D. C.

(3) Miller, Franklin, Scherberger, Richard, Brockmyre, Henry and Fassett, David W., M.D., Determination of Acetic Acid in Air, American Industrial Hygiene Association Quarterly 17:2, pp 221-224, 1956.

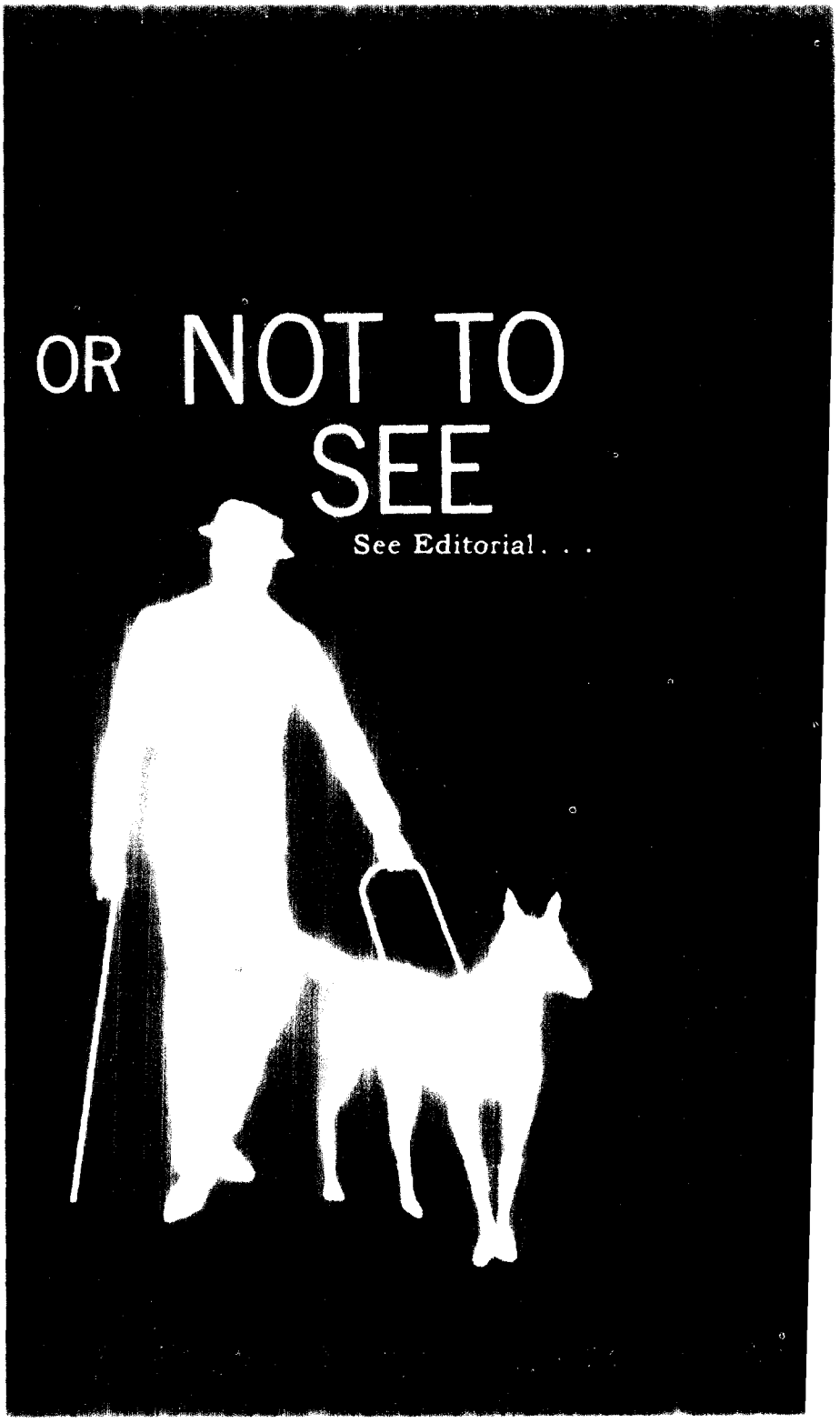
(4) Jacobs, M. B., The Analytical Chemistry of Industrial Poisons, Hazards and Solvents, 2nd Edition, p 374, Interscience Publishers, Inc., New York.

(5) Patty, F. S., Industrial Hygiene and Toxicology, pp 208-209, Interscience Publishers, Inc., New York, 1949.

monitor

The Choice Is Yours...

TO SEE OR NOT TO SEE



See Editorial . . .

monitor

Volume 42 • September 1969 • No. 9

Published monthly by The Industrial Commission of Ohio, Division of Safety and Hygiene, 700 W. Third Avenue, Columbus, Ohio.

Printed under the administration of
HON. JAMES A. RHODES, *Governor*

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THE DIVISION OF SAFETY AND HYGIENE

THOMAS W. GALLAGHER
Superintendent

WILLIAM S. COULTER
Editor

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Cover: Design and Illustration By Bob Doty

SIGHT

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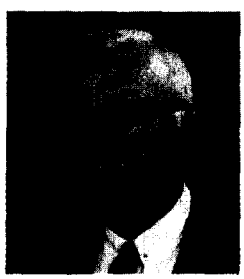
The Choice Is Yours...

TO SEE OR NOT TO SEE



by Thomas W. Gallagher,
Superintendent,
Division of Safety and Hygiene

An Editorial . . .

Each year in September those concerned with industrial accident prevention pay particular attention to eye safety. September has come to have special significance almost universally throughout the United States and indeed many parts of the world as the month in which industrial eye protection is more heavily promoted and publicized.

Many official state publications, and private publications too, stress this highly important facet of total on-the-job safety. Many organized safety programs in business also give special emphasis to eye safety during September.

If more and more exposure is given to eye protection knowledge and promotion, Ohio's fine industrial eye protection record can be even further improved.

Fewer Eyes Lost

While eye injury statistics in Ohio indicate that incidents are holding fairly steady in recent years, eyes lost show a marked downward trend as tabulated in the ten (10) year chart:

YEAR	EYES LOST
1958	27
1959	39
1960	54
1961	36
1962	34
1963	28
1964	32
1965	24
1966	23
1967	13

ALL Young People Must Be Indoctrinated

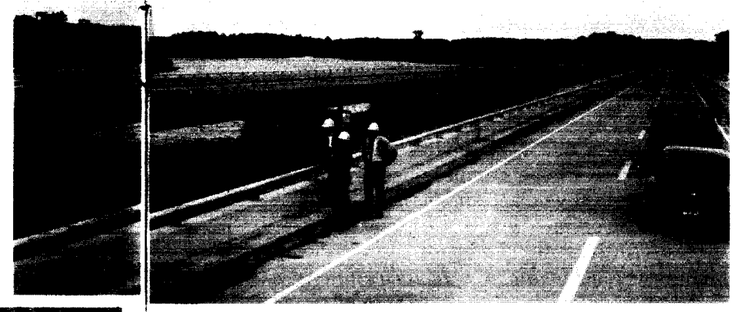
There is no doubt that some fine results have been achieved through eye protection legislation and through on-the-job programs and campaigns *BUT* only when all our upcoming youth and students in school are indoctrinated properly in eye safety, can we honestly feel that we are doing all that is possible to eliminate preventable eye injuries.

As we move toward our goal of providing eye protection instruction in secondary educational institutions of all types and in all colleges and universities we can expect even more drastic reductions in eye injuries.

Ohio Promotes Eye Safety

Ohio provides many aids to industry to help carry forward effective accident prevention programs and all its programs include a wealth of material designed to promote eye safety. Simply write the Division of Safety and Hygiene of The Industrial Commission of Ohio.

BUCHEIT BRIDGES & SAFETY SPAN MANY RIVERS & ROADS



1
Safety men stand on one of two 2,000-foot-long highway bridges built side by side by Bucheit across Meander Lake near Youngstown. "The only thing left to do on this job is to put in a rock slope protection," explains Bucheit Safety Director Jack Pompoco (center) to two Division of Safety and Hygiene safety men.

You stand on one of two 2,000-foot-long bridges built side by side across rippling green Meander Lake near Youngstown. The lake is teeming with fish. Nearby, under patches of blue sky surrounded by gray and white clouds, tops of tall evergreen trees sway in the wind. The trees are part of a dense forest, a game reserve containing many deer.

The bridges were built by Joseph Bucheit & Sons, Construction Contractors, Youngstown. Bucheit, which employs some 350 to 400 during the peak season (summer), had 45 bridges and seven or eight buildings under contract last June.

Save With Safety

Bucheit's operational divisions include excavation and demolition; sewer, waterline and water pollution; equipment and machinery setting; steel erection; highway; design; Stran-Steel.

Bucheit started its formal accident-prevention program last October. About eight months later the company's insurance premiums had been reduced by 15%. "There's a real monetary return from working safely," says John Davidson, Bucheit Engineer, Estimator and Cost Accountant.

Safety Director Jack Pompoco says most of the injuries are punctured fingers, smashed fingers, the type of injury caused by getting fingers caught between things.

Cooperation Key to Safety

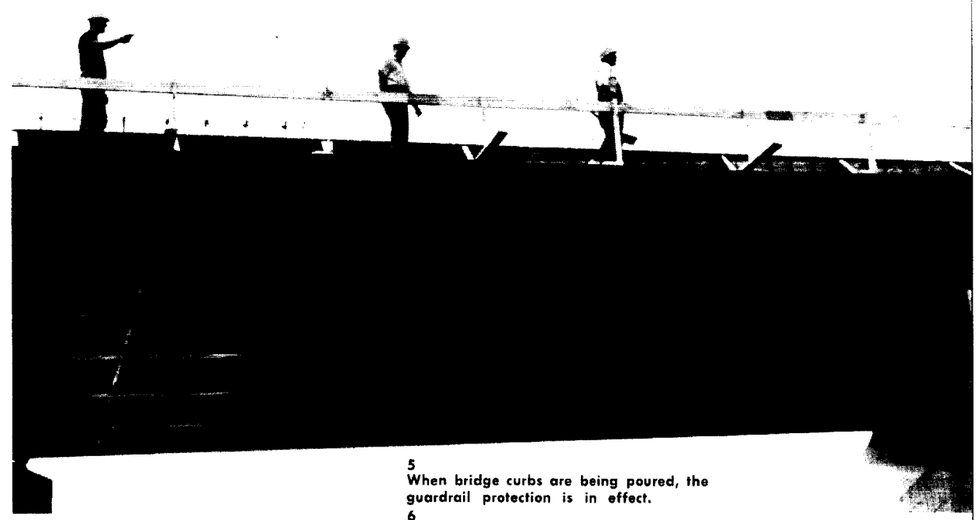
There were seven basic steps in the original safety program:

1. Program to have the full backing of supervision under direct orders of B. J. Bucheit Jr., President. A safety director was assigned and given unlimited say in whatever he wanted to do in regard to safety. *(Continued)*

2
Miniature model of Division Street Bridge project in Youngstown, which was recently started by Bucheit. Pointing out the project is John Davidson, Bucheit Engineer.

3
Acetylene and oxygen tanks in use are firmly secured in upright position. Dennis Carney, carpenter, gets ready to burn.

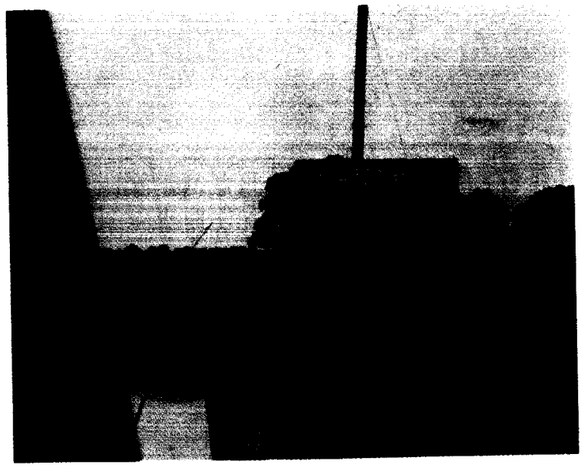
4
Whalers are hanging from hangers that are welded to the steel beams—plywood could not come down because of the overlapping.



5
When bridge curbs are being poured, the guardrail protection is in effect.

6
Men are cleaning up the lumber, removing the nails and stacking lumber in neat piles.

(Continued on next page)



Traffic warned by huge signs about construction.

Robert Pruitt (center), Laborers' Local 935 in Youngstown, receives Bucheit's semiannual Safety Award, a $100 savings bond, at the company's Safety Award Dinner. Presenting the prize is B. J. Bucheit Jr., President. Mr. Pruitt was nominated for the honor by his foreman, Roe Packer (left). The final selection of top safety man was made by Safety Director Jack Pompoco (second from left), from a number of nominees. Some 35 superintendents and foremen attended the dinner, held at the Youngstown Country Club. John Stephen (right) emphasized the value of safety communication between employer and employe. Mr. Stephen is a District Supervisor, Construction Field Services, Division of Safety and Hygiene.

(Continued)

2. One individual, the project superintendent, to be held responsible for the safety program on each project. Job site to be checked for any existing hazards, including traffic. Project safety rules to be established as needed.
3. Complete enforcement of Hard Hat Program. Three dollars spent for a hard hat could save three thousand or more in liability.
4. Safety director to secure safety posters and safety stickers and distribute them to the various projects.
5. Periodic safety meetings with supervisory staff, either on a project level or a company level. If on a project level, meetings to last only five to 10 minutes.
6. Accident reports and first aid. Accident reporting and recommendations as a result of accidents constitute one of the vital parts of any safety program. Phone numbers listed immediately for hospital, physician, ambulance.
7. *"Cooperation—this is the key to safety,"* says *Safety Director Pompoco . . . "The first step toward achieving a safe operation is a sincere desire for safety, translated into effective action."*

Safest Man Selected

It was decided that twice each year Bucheit would have a Safety Award Dinner.

The safety director has all foremen and supervisors name all the safety-conscious men they think should receive the awards, and tell why. Then Safety Director Pompoco selects the one he thinks is most eligible for the safety award, a savings bond, to be presented at the dinner.

Anyone who receives the safety award twice would be eligible for a gold watch or some other fine gift.

The insurance company gives two small savings bonds for the best suggestions as to how to stop vandalism and theft of equipment.

Cooperation Remarkable

John Stephen, District Supervisor of Construction Field Services, Division of Safety and Hygiene, says: "The cooperation we get from Bucheit Company is remarkable—any suggestions or recommendations we've made, they've complied with to the best of their ability. The cooperation we get from the various superintendents is 100 per cent."

Louis Malone Jr., Safety Representative with the Division's Construction Field Services, agrees with Mr. Stephen and adds, "We are especially grateful that Bucheit Company now has an active Safety Director to improve its accident-prevention program."

The green truck in which you're riding bounces over muddy dirt road, with Safety Director Pompoco at the controls. A voice crackles over the radio. Pompoco picks up the mike and answers. The sun peeps through clouds as you admire the green rolling country, a field of wheat waving in the breeze—and clean farm houses and barns, some white, some red.

Hard to Forget Hard Hat

"How do you get all your men to wear their hard hats?" you ask. "Our policy is to fire a man who refuses to wear his hard hat, or is caught without it," Pompoco replies.

He stops the truck at a bridge site, then indicates a crane in operation, pointing out that the boom stops on the rig are just as they should be—and "the operator is sure he doesn't come too close to those wires."

The crane lifts an I-beam which will be used for part of the false work for superstructure of the bridge.

You drive to another bridge being built. "This is a slab top bridge," says Pompoco. "The decks on this are 18-inch thick, reinforced concrete."

How Bucheit Builds Bridges

You ask Pompoco how his company builds bridges and he gives you the following account:

"First you excavate for the pier footers, then form and pour the footers. Secondly you form and pour your columns. Third, you put the caps on the columns.

"When you complete all piers you put your abutment footers in and your abutments.

"Then you pour your bridge deck, if it's a slab top . . . if it's not, you put your steel beams on top of your pier caps.

"When your steel is all braced, welded together and bolted up you put your concrete deck on.

"After that you put up your parapets and curbs.

"The final things on the bridge are your approach slabs."

Safety Span

At a beam bridge you see the I-beams, then whalers (2 x 12s bolted together). On top of the whalers 2 x 6s are laid and nailed; on top of that, 4 x 8 plywood, and on top of the plywood, reinforcing steel.

At the Bailey Road Bridge you hear the loud clinking sound of an air drill and see a small dust cloud as a hard-hatted worker drills anchor bolts.

Not far away Safety Director Pompoco looks upward, pointing toward whalers hanging from hangers that are welded to steel beams. "The overlapping of the deck makes for a much safer job," he says.

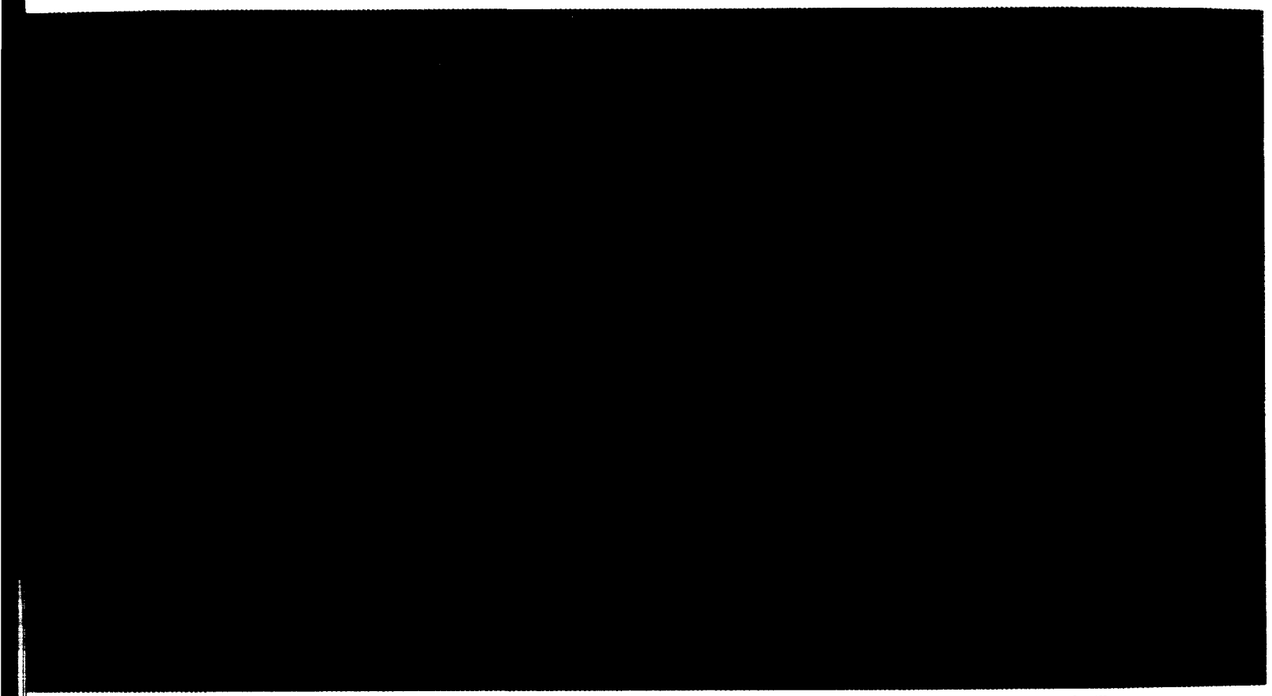
Thus another bridge and safety span another Ohio highway.□

Safety Director Pompoco (left) explains that at Bucheit the key to safety is cooperation—and that the first step toward a safe operation is "a sincere desire for safety translated into effective action." Second from right is Division of Safety and Hygiene District Supervisor, John Stephen; and Division Construction Safety Rep., Louis Malone Jr., extreme right.

Division Safety Rep. Malone (left) and Bucheit Superintendent Stan Rafferty discuss the latest in accident prevention. The project superintendent is responsible for the safety program on each project.

HEATH OHIO REFINERY, PURE OIL DIV., UNION OIL CO. OF CALIF.

'Hazardous' Industry Sees 5th Separate Million Man-Hour Safety Record



Heath Refinery is kept neat and clean—even beautiful wherever possible, as this view of cafeteria and grounds illustrates.

Ralph Daniels (left), Inspector Supervisor, and Ed Wilson, General Inspector, show foam trailer equipment, including hoses of different sizes and miscellaneous nozzles.

"Safety is our way of life," says Plant Manager W. G. "Bill" Dailey. Bill is a veteran of thirty-five years in the promotion of safety in the Petroleum Refining Industry who believes that safety is a joint venture of management and labor.

For obvious reasons, NO SMOKING signs such as this one *must* be enforced. Note bike rider on sidewalk—because plant is so large, personnel often ride bicycles to get from one area to another.

Topped by a silver star, the American flag waves high above red brick buildings on Heath Pure Oil Refinery's 150 acres. Beneath the stars and stripes flaps the blue-and-white Pure Oil flag. Green grass is cut short, hedges and shrubbery neatly trimmed and beds of red, white and pink roses and other flowers add more beauty to a very clean, beautiful place.

Beyond you see a maize of different colored pipes, tanks, towers, chimneys. You hear the chug-chug of engines, the hiss of steam and the whoosh of fans.

Plant Manager, W. G. "Bill" Dailey, tells you, "We've operated 49 consecutive years without shutting the plant down. . . .

"In our industry—it's a potentially hazardous business—we work with chemicals, steam, electricity. We produce primarily gasoline . . . and make jet fuels, naphtha, diesels, kerosine, burning oils, etc."

Mr. Dailey says that on June 3 Heath Refinery reached 1,000,000 injury-free man hours . . . and that it was THE FIFTH TIME in the plant's history that the *million-or-more* safe man-hour record had been achieved. One of these records exceeded 2,834,000 safe man hours—from Jan. 12, 1952 to May 15, 1956.

Proper Attitude "Most Effective"

"We believe that the most effective safety program is a proper attitude," says Dailey, "and for every individual to feel that he's his own personal Safety Supervisor. . . . If I'm not thinking safely, you can give me all the safety signs, etc., and I'll do something wrong.

"We want the job done but we want it done safely. The individual has to be conditioned to think safely. . . . We want our employes to feel and think safely, and be proud of it.

"We have a good attitude and a clean plant."

"Safety Is Our Way of Life"

Dailey says safety is to prevent suffering . . . and he doesn't care if it takes an employe longer to do a job, he must do it safely. If he isn't sure about it, he should get his foreman.

"Safety is our way of life," says Dailey—"work safely, think safely and be a part of it . . . the fellows are doing a fine job."

All This Talk About Accident Prevention Surely Gets Results

The staff meets once every two weeks and discusses safety and safety problems.

Every morning in the Maintenance Department the supervisors meet with the craftsmen and discuss, for about five minutes, the importance of working safely.

The lab group conducts a safety meeting twice monthly.

In the Operating Department they work 24 hours a day. At least once each month the shift workers come to the plant an hour early and discuss safety working procedures with their supervisors. They talk about such subjects as turbines, personnel safety, equipment, and specific problems that come up. Injuries are reviewed, and measures are taken to prevent recurrences.

Once each month, at least, Plant Manager Dailey meets in an assembly with all available employes -- and for five to ten minutes he impresses upon them the importance of working safely together and communicating.

During the summer months new employes come in, so the Safety Department conducts special meetings for them and gives them the fundamentals.

Every department head accompanies Dailey monthly on a plant inspection.

"Talking and thinking and meeting—that's our safety program," says Dailey . . . "We also use films occasionally," he adds.

Dailey explains that the meetings are kept short "so they won't lose interest." A supervisors' meeting, for example, never lasts more than 20 minutes.

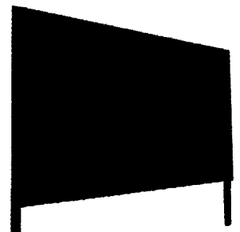
On reaching the 1,000,000 man-hour safety mark they have a "little celebration." Cake and ice cream are served to all employes. In addition, last June each of the 208 employes was given a nicely bound Road Atlas.

"Each Man Is His Brother's Keeper"

General Inspector Ed Wilson is in charge of safety, fire protection and equipment inspection.

"The philosophy here is rather biblical in nature," says Mr. Wilson . . . "each man is his brother's keeper—this is what we try to follow."

Wilson's comment on Heath Refinery's excellent housekeeping: *"If you have a clean place to work I think it's reflected in the way you work*—we're rather fanatical about this."

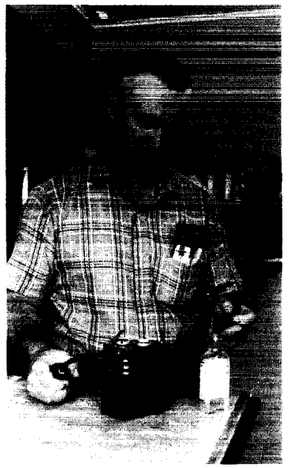


This sign at the refinery tells only part of a marvelous safety story.

(Continued on next page)

(Continued from page 9)

Part of Heath Refinery's elaborate fire-fighting control is this remote steam header with steam control valves for a furnace steam snuffer system.



Gas detectors, which detect most hydrocarbons, are checked and flushed out after each use. Demonstrating is Inspector Supervisor Daniels.

General Inspector Wilson (left) and Inspector Supervisor Daniels hold up "Zoot suit"—emergency suit worn when there is a high concentration of hydrofluoric acid.

Black-on-white signs like this one warn you away from Hydrofluoric Acid (HF) Alkylation Unit. When truck is being unloaded at HF area, they block the road off with two signs reading DANGER — HF ACID UNLOADING — ROAD CLOSED.

Pipefitter Chester Gorley wears HF suit while working in Hydrofluoric Acid Alkylation Unit. He wears the protective suit because hydrofluoric acid vapor *might be* in the atmosphere, but the atmosphere is *normally totally* clear of vapor. Here he is shown inspecting a steam line flange.

Welders' shop shows good housekeeping, which you would see everywhere on a tour of the refinery.

Welding tanks are securely fastened on dollies, for safety and good housekeeping.

Cafeteria, where many safety meetings are held, is shiny and spotless.

Fire and Chemical Hazards

The refinery has very good fire-fighting facilities, and can also call on the Heath Fire Department for help. The plant has a fire-fighting truck which carries 1,000 feet of 2½-inch hose and 300 feet of 1½-inch hose. There are fire rescue suits on the truck. A foam trailer carries a 3% mechanical foam solution, and there is an underground two-solution chemical foam system. Also, there are seven reel houses around the plant.

"We have a complete water system around the plant—49 hydrants," says Wilson. "With the foam system we also have hydrants."

In addition, the plant has fire-fighting training. The Operating Shift Foreman conducts his fire drill on either a weekend or afternoon shift.

Wilson says the plant has work suits, including gloves and respirators, for the Hydrofluoric Acid (HF) Alkylation Unit. "We have A, B, C Class clothing for different situations. . . . If, for example, you're working in the HF Alkylation Unit and you see what looks like steam, you consider it as HF acid vapor—you put on a protective suit. If you get a burn with HF it just keeps burning in, and the treatment is painful.

"After we neutralize the system, all we require are protective jackets, face shield, safety goggles, and protective gloves. Where there is a heavy concentration of hydrofluoric acid, you must wear a special emergency suit."

NO SMOKING signs are, of course, absolutely enforced.

Gas detectors for hydrocarbon detection, for hydrogen sulfide, carbon monoxide, hydrogen cyanide and arsine are checked and flushed out after each use.

Wilson says Heath Refinery follows the State Safety Codes, and provides personnel safety equipment—hard hats, goggles, protective clothing, respirators, etc.

Unsafe Conditions; Buddy System

"We encourage our employes to report unsafe conditions," says Wilson. "When a man comes to us and says something about an unsafe condition, we've got to give him an answer." . . . Wilson explains that if the unsafe condition is corrected or a follow-up answer is given the employe will report if he sees another unsafe condition.

On a tour of the plant with Wilson, you see two men climb a high orange-and-white tower in the HF area—to replace a piece of line. Wilson explains that they're using the Buddy System for safety.

Trouble Fliers

You feel heat from roaring furnaces. A plane flies over the tower. "We pump products to Worthington and Dayton," Wilson says . . . "They're going to follow the pipeline in the plane to see if anything is leaking. They make a periodic check of the right-of-way.

"At night we have to keep the aircraft warning light in operation on top of that tall tower."

Platinum Used for High Octane

Hearing the roar of furnaces and hiss of steam you stop near a unit where there are large blue vessels, yellow pipes, black pipes and silver towers. "This is where we use a platinum catalyst," Wilson says. "We charge naphtha to the unit which is converted to a high octane blending stock."

Naphtha and hydrogen are heated in multiple furnace sections; passed through reactors in series where the reaction products are cooled by heat exchange with the fresh feed and cool reformate is the end product.

At another unit, which has a tall black tower, you see steam shooting outward and upward. "This is the combination high pressure cracker, where they crack topped crude oil and get lower octane gasoline," says Wilson.

In another area they separate the light ends and make straight run gasoline, naphtha, kerosine and diesel oil.

The driver of a red water treater truck beeps his horn before starting around a building. Other vehicle drivers do likewise, because of a black-on-yellow SOUND HORN sign.

Another truck is driven around the plant, the driver stopping at various locations to pick up trash from containers.

High Quality Employe

The sun is peeping through the clouds as you enter a shining showplace that is the cafeteria. A flash of light reflects from a worker's gleaming silver safety helmet while he looks at some of the plant's safety awards on the wall.

Among the refinery's many safety awards are those from the National Safety Council; the National Petroleum Refiners Association; the American Petroleum Institute; The Industrial Commission of Ohio's Division of Safety and Hygiene. One of Heath Refinery's Division of Safety and Hygiene awards was for winning the 1968 State-Wide Oil Refiners Safety Campaign; another was co-sponsored by the Newark Industrial Safety Council.

Also on the cafeteria wall is a long line of some 70 framed pictures of employes who have worked 25 or more years. Near the door are showcases containing numerous large, dazzling sports trophies won by employes.

It seems as though General Inspector Ed Wilson is reading your mind when he puts his coffee cup down on the table and says, "The quality of employe that we've been able to get has been truly remarkable."

ON-THE-SPOT ANALYSIS PROTECTS EMPLOYES' HEALTH

DeWitt Huffman takes a sample. The sample could be any one of the materials listed in Table I—all the way from acetic acid to caustic soda.

It is interesting and dramatic to see a reaction take place before your eyes, particularly when that reaction measures air contaminants that might affect your health. It is also interesting and convincing if the chemistry can be understood by the worker as well as the plant manager.

If, for example, when sampling for an acid gas such as hydrogen chloride you are told—"If the solution in the impinger changes color in five minutes the amount of acid in the air exceeds the safe limit of five parts per million"—your eyes will be glued to the sampler . . . you will be fascinated by the procedure.

All you need are a midget impinger tube, a pump, flow meter, distilled water, a weak acid, a weak alkali, some indicators, other chemicals and a watch. For an acid or alkali determination Fleisher's methyl purple indicator is used. It changes color at exactly the right pH (degree of acidity).

Some of the contaminants that can be measured are given in Table I.

Equipment, chemicals and carrying case used in making tests for air contaminants, by direct color titration.

TABLE I
SUGGESTED NORMALITIES OF SOLUTIONS AND SAMPLING TIMES

CONTAMINANT	IMPINGER SOLUTION	INDICATOR	THRESHOLD LIMIT VALUE	TIME FOR TLV
HCl	H_2O (only)	methyl purple	5 ppm	2 min.
HF	H_2O (only)	methyl purple	3 ppm	3.3 min.
Acetic acid	H_2O (only)	methyl purple	10 ppm	1 min.
NH_3	H_2O+1.0 ml .001 N HCl	methyl purple	50 ppm	12 sec.
H_2SO_4	H_2O (only)	methyl purple	1 mg/m³	20 min.
CrO_3	H_2O+.74 ml .0001 N $Na_2S_2O_3$+K1	starch or Thyodene	0.1 mg/m³	10 min.
Cl_2	H_2O+1.0 ml .0002 N $Na_2S_2O_3$+K1	starch or Thyodene	1 ppm	1 min.
O_3	H_2O+1.0 ml .0001 N $Na_2S_2O_3$+K1	starch or Thyodene	0.1 ppm	10 min.
SO_2	H_2O (only)	methyl purple	5 ppm	1 min.
SO_2	H_2O+1.0 ml .001 N iodine+K1	starch or Thyodene	5 ppm	1 min.
H_2S	H_2O+1.0 ml .001 N iodine+K1	starch or Thyodene	20 ppm	15 sec.
KCN	H_2O+.94 ml .001 N HCl	methyl purple	5 mg/m³ as CN	2 min.
NaCN	H_2O+.94 ml .001 N HCl	methyl purple	5 mg/m³ as CN	2 min.
NAOH	H_2O+.61 ml .001 N HCl	methyl purple	2 mg/m³	5 min.
$FeCl_3$	H_2O (only)	methyl purple	1 mg/m³ as Fe	7.6 min.
Alternate method for				
CrO_3	H_2O (only)	stabilized diphenyl carbizide (.1 gm/10 cc)	0.1 mg/m³	5 min. (for first color)

For those who are interested, the basic calculations are given in Table II:

TABLE II
1 Gram-Molecular volume (GMV) HCl = 1,000 ml 1.0 N HCl
1,000,000 ppm (1 GMV) HCl = 1,000 ml 1.0 N HCl
1 ppm HCl = 1,000 ml .000,001 N HCl
1 ppm HCl = 1.0 ml 0.001 N HCl

Calculations are based on the premise that it takes 1.0 ml of .001 N HCl to change the color of the indicator from green to purple or the pH from 7.0 to 5.3. In event it requires more or less than 1.0 ml of the acid, the figure obtained should be multiplied by that number of ml, 0.8 for example.

This procedure has been used for many years by DeWitt Huffman, Assistant Chief of Engineering and Hygiene, Division of Safety and Hygiene. He gave a paper on it at the Industrial Health Conference, Denver, Colorado, May 12. His paper, "Use of Direct Color Titration in Air Sampling," will appear in the minutes of the American Conference of Governmental Industrial Hygienists.

F. S. Patty, in commenting on this method of sampling in his book, INDUSTRIAL HYGIENE AND TOXICOLOGY, stated: "Although not entirely satisfactory for research work, and for the setting of standards of maximum permissible concentration, these methods are particularly useful in informing the industrial hygienists in the field—of the order of intensity of contamination, and therefore, whether control is necessary, and if so, to what extent."

Tests Proven in Industry

There are numerous examples of the effectiveness of this method of testing in industry in Ohio. A few follow.

On a hot summer day a plant, pickling steel with sulfuric acid, was visited. The mist was so bad that one industrial hygienist could hardly wait until he crossed the street, removed his shirt and literally took a sponge bath in a public fountain. The sulfuric mist concentration was 50 milligrams per cubic meter of air (50 times the TLV). It took only 24 seconds to make the test. In this case all that was needed was a figure and a word to the wise.

Once Mr. Huffman was sampling for chromic acid mist at a plating tank . . . six inches above the tank it was safe. "As an experiment," says Huffman, "we turned off the exhaust on the tank and the color changed immediately and dramatically, indicating the concentration was many times the safe limit. The tests showed the effectiveness of the exhaust system.

"I've taken numerous samples for sulfuric acid mist throughout the state and numerous samples for hydrogen chloride . . . We've even found the hydrogen chloride in excess of the safe limit in the breathing zone of a female employe using heat to seal packages wrapped in vinyl chloride, a plastic. Exhaust ventilation was recommended in that case."

All plating operations can be quickly checked, according to Huffman.

Where chlorine is used for various processes, including purification of steel or aluminum, it can be measured immediately. The gas that results from the reaction is hydrogen chloride, and that can also be detected.

All you have to do is follow your nose . . . and sample for the right thing.

Another example: in a plant where they were recovering aluminum scrap, chlorine was used. The resulting hydrogen chloride was so bad that roofers from an outside contractor refused to work until the hazard was evaluated. Evaluation was made in seconds and the roofers advised as to when and under what conditions it was safe to continue their job.

Another situation occurred on the roof of a chemical company. The employes were harassed by gases. They wouldn't work. They were trying to protect themselves by wet rags over their mouths. Evaluation was made of the hazard. It was not corrected until a malfunctioning piece of equipment in the plant was discovered and unclogged.

"We've made numerous tests for ammonia at Ozalid machines and other places," says Huffman. "When employes smell ammonia they think it's harmful. That is not necessarily the case. A test which takes 12 seconds will tell whether the safe limit has been exceeded."

Huffman says that manufacturing companies have borrowed equipment and used the procedure for evaluating hazards in consumers' plants to escape product liability.

Some of the advantages of the testing method described in this article:

1. The materials used are simple and inexpensive.
2. The results are quickly calculated at the time of the visit.
3. The reactions that take place are very simple and can be understood by most observers. That way they seem to have more confidence in the results.
4. Possibility of error is reduced because it is not necessary to transfer solutions from one container to another. Also calculations are automatic.
5. Loss of solution by "carry-over" affects the results a minimum because there is no back titration.
6. Most of the solutions can be carried in polyethylene bottles and freezing will not affect them.

For those who are interested, a copy of DeWitt Huffman's paper, "Use of Direct Color Titration in Air Sampling," can be obtained from:

Division of Safety and Hygiene
700 W. Third Avenue
Columbus, Ohio 43212.

Division's Cincinnati Branch Office Closes

The Division of Safety and Hygiene's Cincinnati Branch Office closed July 31. However, the services are available through the Dayton Office — Kettering Executive Pk., 3864 S. Kettering Blvd., Dayton, Ohio 45439. Phone: Area Code 513-299-5811.

For You

THE WONDERFUL WORLD OF OHIO MAGAZINE is the Buckeye State's official, full-color, monthly publication. It gives vivid, in-depth coverage of Ohio history, sports, recreation, agriculture, industry, education, the arts — all subjects of interest to Ohioans both in and out-of-state.

This Christmas, THE WONDERFUL WORLD OF OHIO MAGAZINE offers a special holiday edition, with 52 full-color pages giving a many-sided view of Christmas in Ohio — the customs, traditions, gifts, decorations, and recipes that make this such a special season in the Buckeye State. Featured in this Christmas issue will be President Harding's home at Marion decorated for the holidays; recollections of boyhood Christmases in rural Ohio a half century ago; unique gifts and decorations available only from Ohio makers, and much, much more, all of it depicting Christmas in Ohio. This special Christmas edition will be available at newsstands throughout Ohio and neighboring states for $1 or may be ordered by filling out and mailing the form below.

Also perfect for Christmas giving are a year's subscription to this outstanding magazine, a white vinyl binder which will hold a year's copies, or a combination gift of binder and subscription. Anyone you remember with one of these gifts will receive a greeting card bearing your name. By using the form below, enclosing check or money order, you can simplify your own Christmas shopping as well as bring a merry Christmas and year-round enjoyment to those on your gift list.

THE WONDERFUL WORLD OF OHIO MAGAZINE has brought national distinction to the Buckeye State. It has been called the finest magazine of its type to be published by any state or organization. It has won top honors for excellence in all phases of publication in the annual national competition sponsored by the Printing Industries of America. It deserves your support. This Christmas, enjoy and give THE WONDERFUL WORLD OF OHIO MAGAZINE.

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Voyer, Highly Motivated Safety Rep., Passes Away

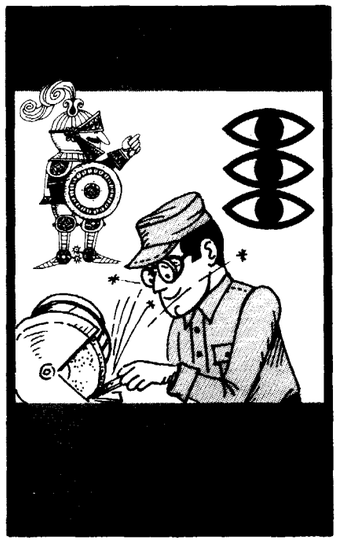
Francis Voyer

On July 11 The Industrial Commission of Ohio and its Division of Safety and Hygiene were saddened with the passing of Francis H. Voyer, Construction Safety Representative in the Toledo District.

He had been with the Division since Feb. 3, 1964. Division Superintendent Thomas W. Gallagher says, "Mr. Voyer had been doing exceptionally good work in his territory in promoting better safety attitudes among contractors and construction men."

Voyer was a native of Hunter, Ohio. He lived in Toledo for 59 years. Before joining the Division he served in almost every official position with the Boilermakers Union, and as Executive Secretary of the Northwestern Ohio Building and Construction Trades Council.

Superintendent Gallagher says that Voyer was a conscientious and highly motivated man and will be greatly missed, not only by his friends and associates in the Division, but also in labor and management circles in the Greater Toledo area.



GOOD VISION GOOD INSURANCE AGAINST TRAFFIC ACCIDENTS

by Warren C. Nelson, Director, Ohio Dept. of Highway Safety

Possession of all the senses is necessary for an absolutely normal life, but people generally agree that sight is our most precious sense.

Our official Ohio Drivers Manual states that "a driver shall have an unobstructed view to the front and both sides of his vehicle, and to the rear of his vehicle by mirror." It goes without saying that good eyesight is essential for such a view.

Drivers should realize that although tests given to license applicants adequately screen out gross vision defects, an eye examination is necessary every two years to ensure sound vision. Each driver should hold himself responsible for these examinations.

Some aspects of vision affecting driving are the following:

Eye Coordination—This allows images received by both eyes to be fused into a single "picture." It also allows a wide range of vision and lessens eye fatigue.

Depth Perception—Makes possible an accurate judgment of distance, space and relative speed . . . important in passing other vehicles and in stopping.

Visual Acuity—Lets driver see the traffic scene clearly, in detailed perspective.

Night Vision—Lets driver see well against approaching headlights and recover quickly from their glare. A driver with good night vision can also see well in the low illumination beyond the range of his headlights.

Field of Vision—The ability to see at extreme sides while eyes are looking ahead.

Hugh B. McGlade, retired technician from the Ohio State University Department of Physiology, demonstrated at the recent All-Ohio Safety Congress that a lateral "blind spot" exists which affects peripheral vision. Drivers should keep this in mind and be extra cautious in such potential danger areas as intersections and railroad crossings.

Motorcycle riders are now required by law to protect their eyes by the use of safety goggles, spectacles, a face shield or windscreen.

Sunglasses, prescription or not, should never be worn for night driving. Even tinted windshields reduce vision by 25 per cent. Reduced vision is a primary cause of night accidents, especially those involving pedestrians.

If you suspect your vision is less than it should be, see an eye doctor right away for whatever corrective measures he deems necessary. Good vision is one of your best insurances against traffic accidents.

Jerome "Jerry" Balluck, of Youngstown, is a central and northeastern Ohio "Safety Director" Program Representative. He has been with the Division since 1961. During his tenure he has served in many capacities, including Safety Advisor for Schools and Municipalities, worked with industry and as instructor in the Supervisors' Safety Training Course.

Jerry says that close communication with foremen, discussion of proven methods, techniques, and first-hand experiences have been most rewarding.

Pre-Division employment included steel mill experience at Republic Steel Corp. in Youngstown, production work in fabricating plants in the Mahoning Valley industrial complex, and sales experience in that section of the state.

Born and reared in Youngstown, Jerry attended the city's schools —and graduated from the College of Commerce, Ohio State University. Prior to graduation he served with the Army during the Korean conflict.

Jerry is a member of the Ohio-Pennsylvania Chapter of A.S.S.E. He gets relaxation by playing golf—snow is the only thing that keeps him away from the tee. When the snow falls Jerry reverts to playing the indoor game of chess.

Division of Safety and Hygiene

Gentlemen:

I understand that changes have been made in the standards for eye protection. Is this true, and what major changes have been made? What is the possibility of obtaining eye protection that does not meet standards prescribed?

Purchasing Agent

Dear Mr. Purchasing Agent:

The change in the standards came into being as the result of dividing the old American Standards Association Safety Code, Z2.1-1959—which covered head, eye and respiratory protection—into a separate standard for each of these areas. All industrial eye protection is now known as Z87.1-1968, as prescribed by the United States of America Standards Institute.

One of the areas of note is that eye protection shall be marked as follows:

1. Frame shall bear a trademark or name certifying the manufacturer.

2. Each separate lens shall be distinctly marked in a manner by which the manufacturer may be identified.

3. In addition, all heat treated glass filter plates or lenses shall be marked with the shade designation and the letter H.

4. Such markings shall be clear-cut and permanent and so placed as not to interfere with the vision of the wearer.

Any reliable source will have its product comply with the preceding. Thus, you can be assured that all of the standards prescribed are being met. Should you wish, you might obtain a copy of Z87.1 from the United States of America Standards Institute, 10 East 40th Street, New York, New York 10016.

Sincerely,
A. Maines, Supervisor,
Industrial Accident
Prevention Services

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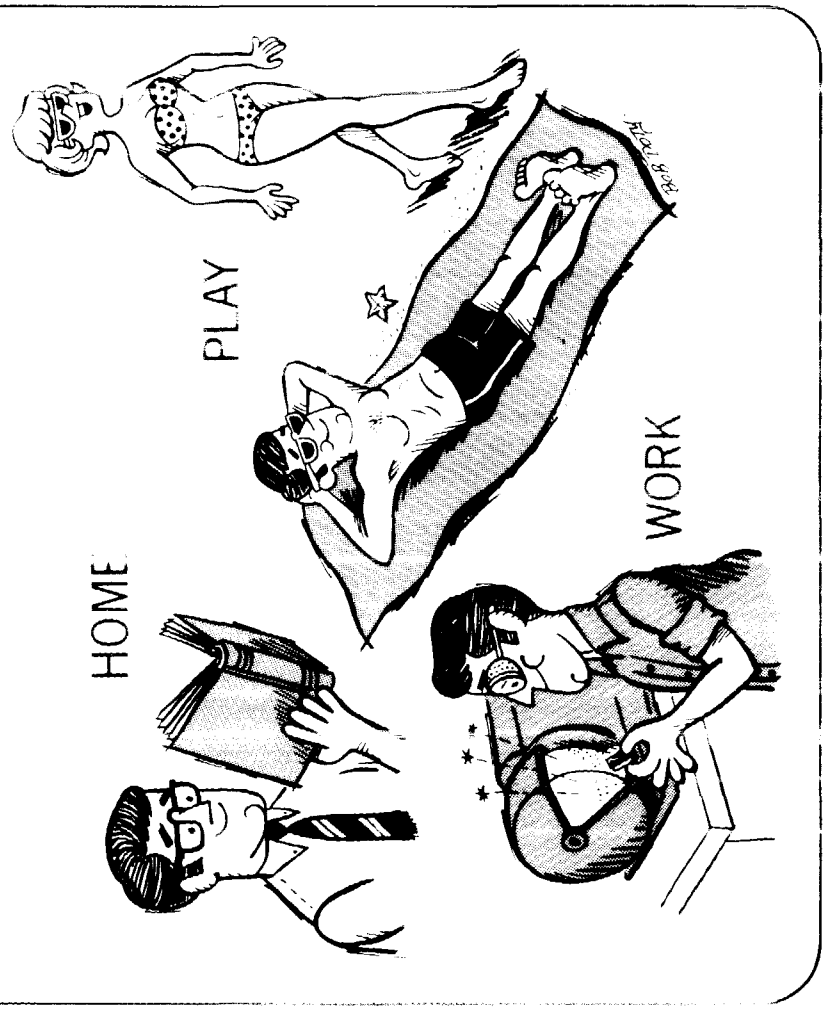


In order to avail yourself of Ohio's outstanding industrial safety training program known as "Pattern for Progress," write the Division of Safety and Hygiene, 700 W. Third Ave., Columbus, Ohio 43212.

TO MONITOR READERS: IF YOU CHANGE YOUR ADDRESS YOU MUST INCLUDE YOUR COMPANY'S RISK NUMBER.

Methyl Vinyl Ketone

Doodle Pad

Goldsmith + Egerton

Second Order

Transition pt.

90°C

B.P. - 76 mm 79-80°C

D 20 .8636

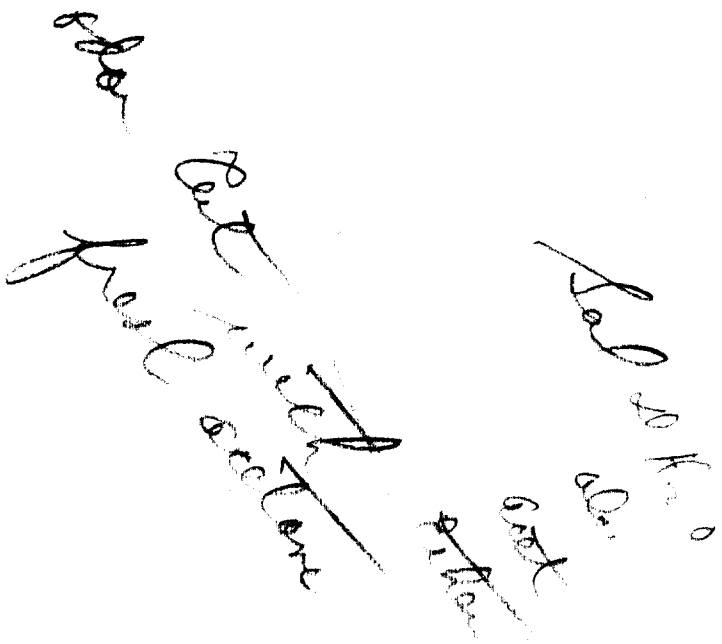
@ 20°C

from the desk of
DOROTHY OBITTS

8/12/6

Blow Molders

I. B. P. - 162°
5 - 178°
10 - 180



at 170° it foamed right over first time

Glidden Elmwood picked up at Foamed at 100° Loss

from the desk of
DOROTHY OBITTS

8/12/69

I. B. P. - 150°
5 - 158°
10 - 159°
15 - 162°
30 - 164°
40 - 164°
50 - 172°
60 - 182°
70 - 188°
90 - 202°
100 - 212°

Jumper.

Laboratory Report

CROBAUGH LABORATORIES

RESEARCH • ANALYSIS • TESTING

3800 PERKINS AVENUE
CLEVELAND, OHIO 44114
216 - 881-7320

To: Obitts Chemical Company
142 Abbe Road
Elyria, Ohio 44035

Reporting Date NOvember 30, 1968
No. R 4617
Date Received November 28, 1968
Material Solvent
Marked Methanol
P. O. No. Verbal

Additional work on Solvent Sample:

Specific Gravity	@25°/25°C	0.800
	20	.8035
	15	.807

Respectfully submitted,

CROBAUGH LABORATORIES

H.R. Friedberg

mc

No fog when 20 cc is diluted to 100 cc with water
10 cc Meth. 300 with Toluol (Goodyear)

My test
add 20 cc of Tol. to 20 cc of MeOH = 40 cc, to this add mineral spirits - at 52 it will still clear on mixing at 53 cc it fogs and won't clear up. Finally settling out two layers layers which separate at 40 c.c.

dilute to 66 cc w/ Tolmol (add 3cc tolmol)
and the entire system clears up.

Laboratory Report

CROBAUGH LABORATORIES

RESEARCH • ANALYSIS • TESTING

3800 PERKINS AVENUE
CLEVELAND, OHIO 44114
216 - 881-7320

To: Obitts Chemical Company
142 Abbe Road
Elyria, Ohio 44035

Reporting Date NOvember 30, 1968
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Marked Methanol
P. O. No. Verbal

Additional work on Solvent Sample:

Specific Gravity	@25°/25°C	0.800

Respectfully submitted,

CROBAUGH LABORATORIES

H.R. Friedberg

mc

Laboratory Report

CROBAUGH LABORATORIES

RESEARCH • ANALYSIS • TESTING

3800 PERKINS AVENUE
CLEVELAND, OHIO 44114
216 - 881-7320

To: Obitts Chemical Company
142 Locust Street
Elyria, Ohio 44035

Reporting Date November 26, 1968
No. R 4617
Date Received November 20, 1968
Material Solvent Mix
Marked Methanol
P. O. No. Verbal

G C ANALYSIS:

Peak	Material	Volume Percent
1	Acetone	0.4
2	Methanol	95
3	Isopropanol	1
4	Methyl isobutyl ketone	1
5	Water	2.5

Please see chromatograms #1170 and #1171.

Respectfully submitted,

CROBAUGH LABORATORIES

Henry R. Friedberg

cg

#2

CROBAUGH LABORATORIES BITTS

CHROMATOGRAM # 1170

DATE 11-26-68 SAMPLE # R4617 OPERATOR LTK

SAMPLE Methanol SIZE 5 µl

COLUMN Poropak Q LENGTH 8 FT.

CARRIER GAS 100 ML/MIN. 40 PSI H_2 ML/MIN. PSI

INJ. PORT 230 °C BLOCK 200 °C COLUMN 100/225 °C DETECTOR 200 °C

BRIDGE POWER 150 MA DETECTOR TC x 64

CHART SPEED 1/4 IN/MIN. PROGRAM 5.6°/min

6
5
4
3
2
1
0

#5

#1 and #3

↑

CROBAUGH LABORATORIES OBITTS

CHROMATOGRAM # 1171

DATE 11-26-68 SAMPLE # R4617 OPERATOR LTC

SAMPLE Methanol SIZE 5 µl

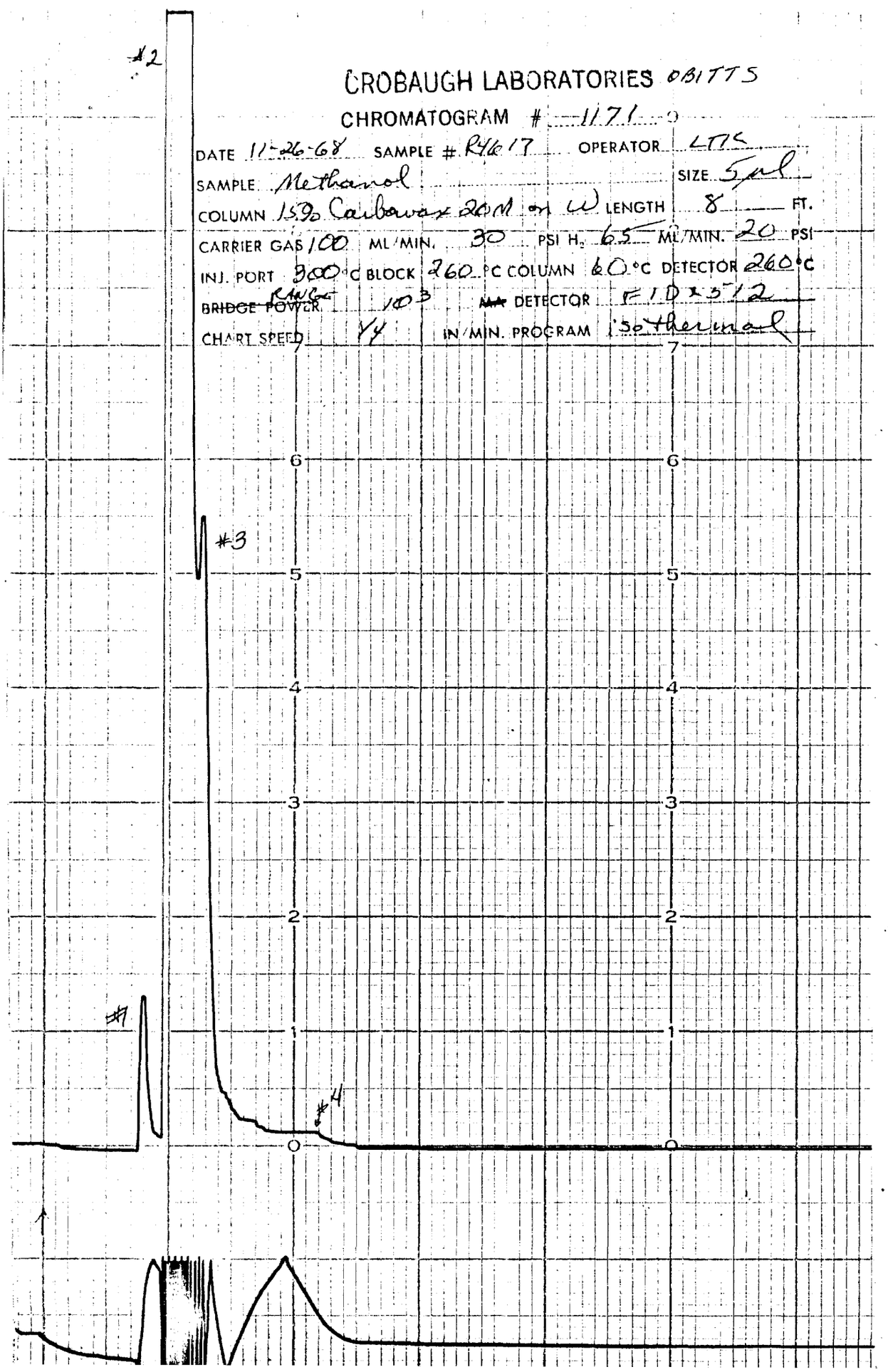
COLUMN 15% Carbowax 20M on W LENGTH 8 FT.

CARRIER GAS 100 ML/MIN. 30 PSI H. 65 ML/MIN. 20 PSI

INJ. PORT 300 °C BLOCK 260 °C COLUMN 60 °C DETECTOR 260 °C

~~BRIDGE POWER~~ RANGE 10^3 ~~AAA~~ DETECTOR FID x 5^-12

CHART SPEED 1/4 IN/MIN. PROGRAM Isothermal



Laboratory Report

CROBAUGH LABORATORIES

RESEARCH • ANALYSIS • TESTING

3800 PERKINS AVENUE
CLEVELAND, OHIO 44114
216 - 881-7320

To: Tag Chemicals Company
14701 Detroit Avenue Room 785
Lakewood, Ohio 44107

Reporting Date August 15, 1968
No. R 3817
Date Received August 13, 1968
Material Solvent
Marked Methanol
P. O. No. Verbal

G C ANALYSIS

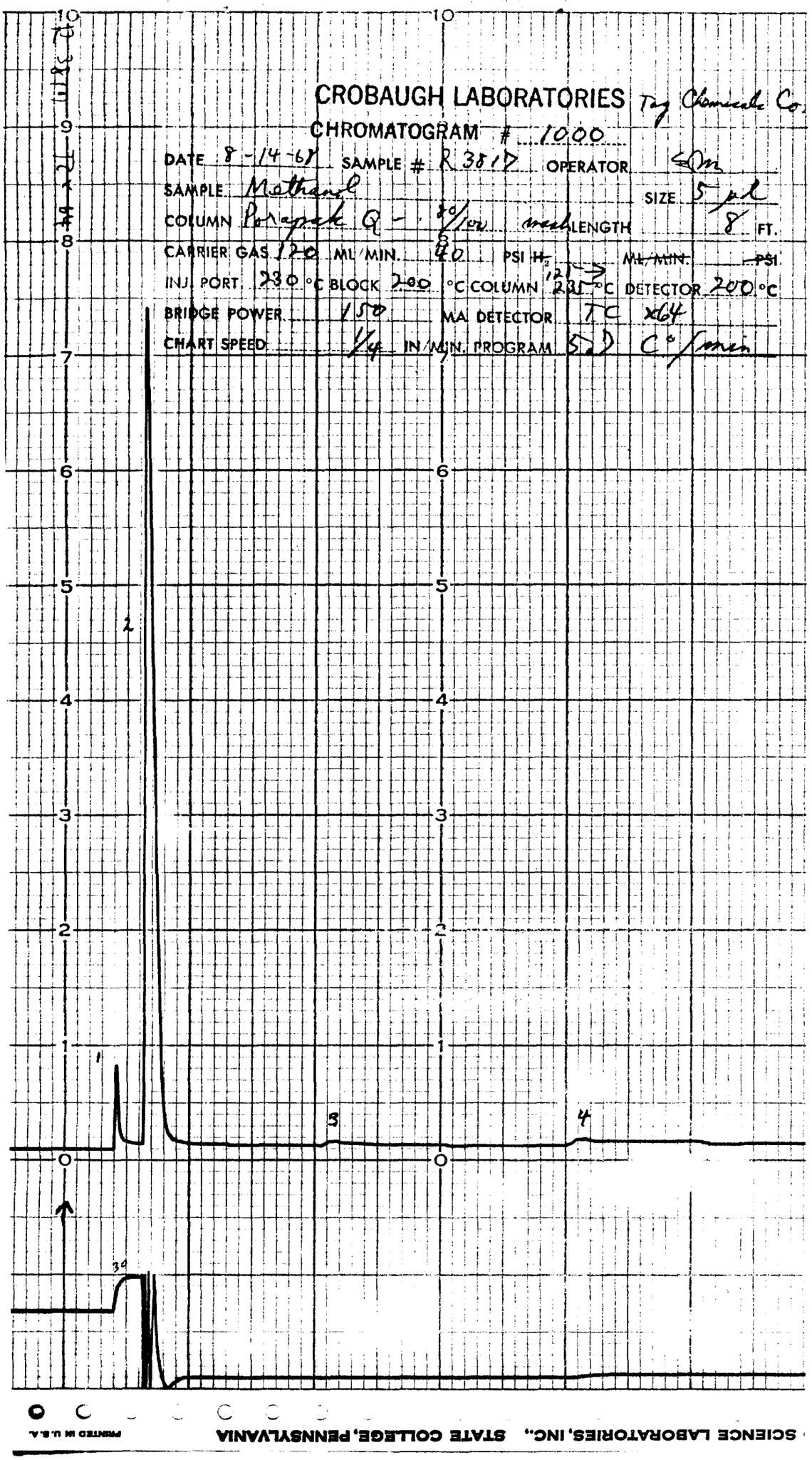
PEAK	MATERIAL	VOLUME PERCENT
1	water	4%
2	methanol	93%
3	isopropyl alcohol	1%
4	unknown	2%

See chromatograms #1000 and #1001

Respectfully submitted,
CROBAUGH LABORATORIES

Henry R. Friedberg

jr



SCIENCE LABORATORIES, INC., STATE COLLEGE, PENNSYLVANIA
PRINTED IN U.S.A.

CROBAUGH LABORATORIES — Tag Chemicals Co.

CHROMATOGRAM # 1001

DATE 8-14-68 SAMPLE # R 3817 OPERATOR [illegible]

SAMPLE Methanol SIZE 5 µl

COLUMN Porapak Q - 80/100 mesh LENGTH 8 FT.

CARRIER GAS 120 ML/MIN. 40 PSI H₂ 12.5 → ML/MIN. PSI

INJ. PORT 230 °C BLOCK 200 °C COLUMN 235 °C DETECTOR 200 °C

BRIDGE POWER 150 MA DETECTOR TC x 4

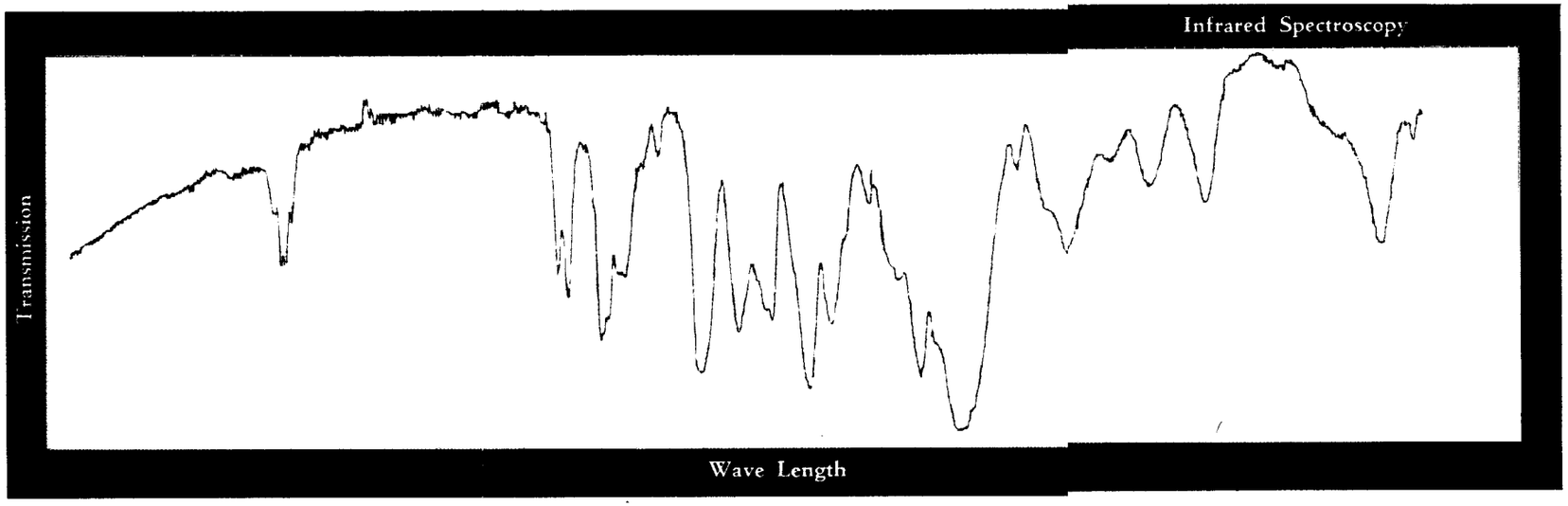
CHART SPEED 1/4 IN/MIN. PROGRAM 5.9 C°/min

R 3817

1 2 3 4

6 Buckets, 3/4 full, to each comp. (2000 gal) of isoprop heat to 70° for best results in adding caustic. Ck results about 1½ drums of water drain off, and about 95% alcohol results

Isopropyl Alcohol



ANALYSIS

RESEARCH

STAFF TRAINING

CONSULTATION

Prompt and Confidential Service

Analytical Research Associates, Inc.

1432 KARL ROAD PHONE 267-0279 AREA 614 COLUMBUS, OHIO 43224

ANALYTICAL PROBLEMS?
RAW MATERIAL ASSAY?
COMPOUND PURITY?

Progressive management is today aware of the necessity and value of well implemented research and development programs. To obtain optimum results these programs must be supported by adequate analytical service.

Quality control can frequently be suitably realized only via instrumentation.

It is becoming increasingly difficult to justify the expenditures for the specialized instrumentation and staff competence which are required for a modern approach to analysis.

Analytical Research Associates, Inc. offers equipment and experience to provide a portion of the spectrum of this specialized analytical service. A few of the services offered include infrared spectroscopy . . . vapor phase chromatography . . . flame photometry . . . microchemical analysis . . . trace analysis . . . microscopy . . ,

COMPETITIVE PRODUCT COMPOSITION?
QUALITY CONTROL?
MATERIAL IDENTITY?

Identification of unknown compounds.

Determination of molecular structure.

Product control.

Quantitative analyses.

Composition of competitive products.

Protection of patented compositions.

Quality control of raw materials.

Air pollutant identification.

Contaminant identification.

Establish optimum process conditions.

Product degradation studies.

Analytical Methods Development

Staff Training in:

- Infrared Spectroscopy.
- Mass Spectrometry.
- Vapor Phase Chromatography.

WHAT ANALYSIS VIA INSTRUMENTATION CAN DO FOR YOU

A SOLVENT MANUFACTURER monitors product by infrared to insure complete chlorination.

A PAINT MANUFACTURER studied deposit on underside of paint blisters to eliminate failures.

A FOOD JAR LID PLANT checks raw materials . . . resins, plasticizers, solvent mixture . . . to obtain uniformity of formulation to insure high speed lid processing.

A PHARMACEUTICAL PRODUCER monitors low sodium product to insure satisfactory parts per million sodium content.

A RESIN FORMULATOR checks solvent mixture lots by vapor phase chromatography to insure uniformity and stability of product.

BUILDING INSULATION MANUFACTURER checks metal oxide raw material for presence of soap to insure fluid pumping and eliminate caking in pump.

A PAPER PROCESSOR required analysis of sludge on drain screens to establish which adhesive from used box paper caused clogging.

A POLYMER PROCESSOR studied thermal oxidation of polymer by infrared spectroscopy to establish optimum molding conditions.

A METAL HEAT TREATING PLANT studied inorganic salt bath mixture to determine actual ion species present under molten conditions.

AN ADHESIVE MANUFACTURER examined product at various stages of processing to establish where undesirable color was introduced to the material.

A UNIVERSITY PROFESSOR requested quantitative infrared determination of isomer formation in a new compound synthesis.

A PHENOLIC RESIN PRODUCER monitors state of resin to insure uniform processing and final properties.

AN EDIBLE FAT PROCESSOR required a check of antioxident level to insure adequate and uniform protection.

A TAPE MANUFACTURER studied the processing of a modified resin to confirm that cross-linking occurred in finished product.

A HERBICIDE FORMULATOR required quantitative infrared analysis of his finished product to establish satisfactory shelf life.

A FOOD PROCESSOR used infrared to confirm distribution of humectant in product.

A RUBBER PARTS MANUFACTURER requested analysis of hydraulic fluids to identify contamination which caused gasket failures.

AN ELECTRIC MOTOR PLANT submitted motor bearing to confirm error in bearing lubricant.

FACILITIES

BECKMAN IR-4 Recording Spectrometer

Double monochrometer
Equipped with sodium chloride optics

REFERENCE SPECTRA LIBRARY

Spectra of over 20,000 pure compounds and 10,000 commercial compounds on file

VAPOR PHASE CHROMATOGRAPHY

Custom built unit, equipped with thermal conductivity detector to permit qualitative, quantitative and semi-preparative operation

AUXILIARY EQUIPMENT AND SERVICES

Facilities to handle organic, inorganic, gas, liquid, solid, or solution samples
Equipment to concentrate and/or separate components by distillation, extraction, column or paper chromatography, etc.
Flame photometry
Sample collection equipment
Gas samples, cold trap concentration, etc.
Vacuum rack for manipulation of gases and volatile liquids
Organic functional group analysis
Inorganic wet quantitative analyses
Microchemical and spot tests

TECHNICAL STAFF AFFILIATION

Members of American Chemical Society
Fellow of American Association for Advancement of Science
Members of Air Pollution Control Association
Members of Coblentz Society
Members of American Society for Testing Materials.
Participants in ASTM Committee activities
Members of Society of Applied Spectroscopy.

SUBMITTED SAMPLES should consist of 0.5 grams or more if possible, although smaller sample (1 drop to 2.5 mg.) can be handled if necessary. Samples are normally retained by the laboratory but will be recovered and returned if requested. A statement of the purpose for which the spectrum is intended is helpful in the selection of the optimum instrument conditions appropriate to the problem.

THE FEE FOR A SPECTRUM ONLY is $15. per sample.

THE FEE FOR QUALITATIVE infrared spectral work is $25. to obtain a spectrum and a preliminary interpretation of structure. An hourly rate is charged for additional spectral interpretation, reference file searching and additional laboratory work.

A DISCOUNT of 10% is allowed for a request of 5 or more samples submitted at one time.

FOR COMPLETE UNKNOWNS, which are usually mixtures, it is recommended that authorization for "not to exceed $75." be issued to permit some separations and spectral file searching. In the event that the system is readily separated and identified, the actual cost will be less than the authorized $75. and will reflect the staff time expended. If the sample is complex and not easily resolved, a report will be submitted when the $75. is expended together with an estimate of the additional effort required to complete the analysis.

QUANTITATIVE ANALYSES are quoted on an individual basis according to the number of components and the complexity of the mixture.

WORK IS BEGUN WITHIN ONE WEEK OF RECEIPT OF SAMPLES AND IS NORMALLY REPORTED WITHIN TWO WEEKS.

ALL WORK IS COMPLETELY CONFIDENTIAL AND RESULTS ARE THE SOLE PROPERTY OF THE CLIENT.

Lacquer Products.

40% Active Solv.
60% Aromatic
Mostly Toluol
B. R. 180 to 290
dry SP. Gr. .835 - to .840
as good as K K but faster.

Drake Petroleum Company

6231 North Pulaski Road
CHICAGO 46, ILLINOIS
JUNIPER 8-2060

2323 Lanasol Rd.
DORAVILLE (Atlanta), GEORGIA
Glendale 7-3526

4101 San Jacinto
HOUSTON, TEXAS
Jackson 3-3832

3482 Ridge Road
CLEVELAND, OHIO
Woodbine 1-3340

P. O. Box 45
CEDAR RAPIDS, IOWA
Empire 3-3781

LABORATORY REPORT

PRODUCT: F B- Medium Burn

DATE _____ REMARKS _____

ASTM Distillation	TEMP. °F	A. P. I. Gravity 60/60 °F
I. B. P.	140	Sp. Grav. 60/60 °F
5%	150	Lbs. Per Gal.
10%	180	Dr. Test
20%	200	Odor
30%	240	Color
40%	260	Corrosion
50%	280	
60%	285	Flash, Tag C.C.
70%	300	Aniline Point
80%	315	Mixed Aniline Point
90%		K. B. Value
95%		
E. P.		Viscosity @ °F
		Viscosity @ °F
		% Aromatics
		Unsulfonated Residue
		Miscellaneous

Only 80% yield thus % can would be changed

SIGNED _____

TECHNICAL PRODUCTS, INC.
3500 Ridge Road
Cleveland, Ohio
WOodbine 1-3340

LABORATORY REPORT

Product: Continental Can - Mt Vernon

Date 3/9 Remarks

readings are 1/2 value as I used 400cc not 200cc

ASTM Distillation	TEMP. °F		
I.B.P.	150		Sp. Grav. 60/60 °F .850
5%	156		Lbs. Per Gal.
10%	158		Dr. Test
20%	158		Odor char of acetate
30%	159		Color
40%	159		Corrosion
50%	160	correct	Sol in H_2O - 40%
60%	161	170	Flash, Tag C.C.
70%	162	175	Aniline Point
80%	163	190	Mixed Aniline Point
90%	165		K.B. Value
95%	165		Sol in H_2SO_4 - 10%
E.P.			Viscosity @ °F
			Viscosity @ °F
			% Aromatics
			Unsulfonated Residue
			Miscellaneous about 85% yield
			maybe a little acetone, about
			30% alcohol (denat ethyl)
			bal eth ac. plus about 5% hydrocarbon

Signed

treat with caustic, leave set, otherwise will clog up still + smoke

NY + I P A

Treat with ~~50#~~ 100# NaOH per bowl, product will be (2500g) slightly tinted (Red).

~~Filter with Darco + may be ... K_2CO_3 if wet & color will then be O.K. for sale~~ - recover - Will pass for foundry use + possibly 99% grade (5 & more)

90% yield

Use a little oil - don't boil down hard and the product won't discolor at the end of a run. If it should, remove color with a very small amount of caustic and redistill.

100 anhyd = .787

98% .792

95% = .799

120/5%

1% = 2½

Chem Dust
NY IPA

80%

Sp. Gr. .744

B.R. 245-287

V.M. & P.

Pure

Cut at:

Don't change setting of steam valves

$\frac{1}{2}$ of 100

312 — 342

872
744
128

	P.K.	%
Isocolene	2.3	
VMP	2	
Acetone	46.3	
Methanol	2.2	0.3
Ethanol	2.1	
But a	3.0	
M 1 BK	2.8	
Tol	30.1	
Xylene	2.9	

Not detectable

Post Card

Obitto Chemical Co.
142 Locust St
Elyria, Ohio

LABORATORY

LABORATORY AND RESEARCH INSTRUMENT REPAIR COMPANY

P.H. METERS	CENTRIFUGES
SPECTROPHOTOMETERS	OVENS
COLORIMETERS	SHAKERS
WATER BATHS	MIXERS, ETC.

4318 SPOKANE AVE.
CLEVELAND OHIO
741-5789

Foiling the label switchers

New adhesives make price tags 'stay put' in store but can be readily washed off with water at home

A new market for "permanent-removable" price labels—which can be washed off but not peeled off—seems to be opening up as retailers look for a way out of a dilemma.

They've found that some of their customers have developed a certain price-cutting talent—switching price labels stuck on displayed goods.

Then when the stores came up with labels that were difficult to peel off, customers howled in exasperation because they couldn't get the labels off when they got home.

"Whether it is a brand new $3,000 car or a 10-cent drinking glass," says a chemical company spokesman, "the problem is the same. After the buyer makes his purchase, and tries to scrape, rub, scratch, scrub, fray, and scour the price label off, he may be hard put to call the item new any longer."

Yielding to Water: Various companies are coming up with wash-away labels that they expect will replace those based on synthetic or natural rubber adhesives, which dissolve in organic solvents but not in water. What they're doing:

Fitchburg Coated Products Inc. (Scranton, Pa.) is making a new adhesive label stock tradenamed Wash-Away, which adheres tightly to Teflon, vinyl and oily surfaces but which can be washed off—even in big lots by automated washing equipment.

Fitchburg, a division of Litton Industries, says labels from the stock are completely permanent in the store but wash away easily under a faucet. A basic ingredient in the stock is the resin Gantrez AN, a water-soluble polyelectrolyte made by GAF Corp., formerly General Aniline & Film.

Label manufacturers currently using Fitchburg's water-removable stock include National Tape & Label (Cincinnati), Professional Tape (Riverside, Ill.). Royal Tape & Label (Boston), and Allen Hollander Co. (New York).

Stickers for Skillets: Hollander, for example, markets wash-off labels under the tradename Able-Label for manufacturers of hard goods, pots, pans, major appliances and giftwear, and under the tradename Vinyl-Stik for manufacturers of washable vinyl products and other washable fabrics, replacing the traditional hang tags. Other suggested uses: sealing safe-deposit boxes, file drawers, storage bins, drugs and valuable shipments. Hollander will supply labels with consecutive numbering for tight control. The labels themselves—as well as the adhesive—dissolve completely in water.

A Japanese firm, Kuramoto Sangyo Co. (Tokyo), is marketing a water-soluble adhesive sheet called Seven Tak Magic. Both label and adhesive dissolve in water.

Kleen-Stik Products (Newark, N.J.), formerly a division of National Starch and now a division of Compac Corp., is market-testing a pressure-sensitive label adhesive that can be water-resolubilized.

The 3M Co. (St. Paul, Minn.) and the Fasson Division of Avery Products (Painesville, O.) are also studying the wash-off label market.

Multi-Million Market: How big is this market? Estimates center on $80 million/year at the stock manufacturers' level and $110 million at the label manufacturers' level.

According to GAF, about 2 million lbs. of such adhesives are produced each year.

Anticipating a big swing to wash-off adhesives and expanded markets for its Gantrez resins (water-soluble copolymers of methyl vinyl ether and maleic anhydride), GAF has more than doubled its Gantrez AN production capacity. The company finished the $2.5-million addition to its Calvert City, Ky., high-pressure acetylene chemicals plant last month, and has also added a hydrolized version of the resins, Gantrez HY, which dissolves rapidly in cold water.

In addition to making adhesives, the resins are also used as film formers, dispersants, thickeners, binders, stabilizers, curing agents and rust inhibitors.

Formulations suggested by GAF for

COUNTDOWN

is part of an improved line of process converter-transmitters. The units are field mounted, accept all standard process inputs from thermocouples, turbine meters, strain gages, resistance-bulb and pressure devices. The converter-transmitters can be used for analog and digital control. Units are also designed specially for direct-digital control.

OXYGEN ANALYZER: The Hayes Corp. (Michigan City, Ind. 46360) has introduced a new suppressed-range oxygen analyzer for measuring the oxygen content in gas mixtures. The analyzer, Model 633-II, is not affected by line voltage changes of 100-130 volts and frequency variations from 47 to 63 Hz. Ranges: 20-21% and 16-21%; 98-100% and 90-100% oxygen. Other ranges are available when requested. Accuracy ±2% of span below 30% oxygen and ± 3% above 30%.

NEW SPECIALTIES

CARBON MICROSPHERES: General Technologies Corp. (1821 Michael Faraday Dr., Reston, Va. 22070) is offering hollow, thin-walled carbon spheres as a new filler material. The new Carbospheres come in a diameter range of 1-300 microns, have a bulk density only 5% that of most other filler materials, GTC says. Suggested uses are in high-temperature plastics and composites, and as a low-density filler for adhesives, resins and potting compounds.

SILICONE COATING/PACKAGING MATERIAL: A new series of one-component, heat-curable liquid silicone rubber materials for conformal coating or packaging of electronic components is available from General Electric's Silicone Products Dept. (Waterford, N.Y. 12188). The new products, RTV-815, -830, and -835, are supplied in both filled and clear grades with viscosities ranging from 3,500 to 200,000 cps., and may be blended to obtain a desired viscosity. GE says the new products do not require a catalyst or premixing.

FIRE RETARDANTS: Humphrey Chemical Corp. (Box 2, Edgewood Arsenal, Md. 21010) is marketing Quench, a new series of fire-retarding emulsions containing a water-soluble zinc-ammonia-borate complex, vinyl copolymers, and appropriate plasticizers. This latex system, after drying, is said to permit the fire-retarding and afterglow-inhibiting properties of insoluble zinc borate to remain evenly dispersed throughout the substrate. The fire retardant is applied directly to woven and nonwoven fabrics, paper, burlap, etc., by padding, spraying, roll-coating and drying in a single-pass operation. Suggested dry add-on is 30-50%, depending on the material and degree of fire retardance required. Cost is approximately 50¢/lb. on a dry solids basis.

COIL STOCK IN COLOR: Penn Fibre & Specialty Co. (2024 E. Westmoreland St., Philadelphia 19134) is offering extruded high- and low-density polyethylene, polyacetals, nylon and polypropylene in 12 standard colors at no premium charge for color. The coil stock is supplied in continuous lengths, in thicknesses of 0.015 to 0.060 in., and in widths up to 4 in. Polypropylene and polyethylene are supplied in thicknesses up to 0.125 in.

URETHANE CASTING SYSTEM: Allaco Products Inc. (130 Wood Road, Braintree, Mass. 02184) says its new urethane system—with liquid resin and liquid hardener—can be poured cold, cures at room temperature, and can be demolded within 1½ hours. The system, Duraflex A80CV, is suitable for making inexpensive flexible molds and for potting and encapsulating applications.

THE TOLEDO TANK COMPANY
1010 New York Ave. (419) 726-3411 Toledo, Ohio 43611

.755 Sp. Gr.
of Foreun
where still stops
BR

IBP - 215 ?
10 % - 240
25 - 258
50 - 270
75 - 294
80 - 305
90 - 320
EP - 340 (1½" above)

Verona Isopropyl
Alcohol

10,000 gal.
79.82 Isop (Rusty)
18.74 Watr
1.41 Turp.

Finish Goods are
S.P.Gr. .796 = 95% Isop
Water white - Clouds
at 3 to 1 water to alcohol,
because of trace of turp.

Dry w/ caustic then dist.

STEEL
ALUMINUM

FABRICATION
TOLEDO
TANK
TANKS

ALLOYS
STAINLESS

Flo-Rite

IBP - 150 ? (? lower)
10 - 165
20 - 170
30 - 170
40 - 173
50 - 175
60 - 176
70 - 180
80 - 185
90 - 230
EP

H_2SO_4
50%

50% Cyclone
10 MEK
35 Lac. Del.
15 Tolu

S.G. .78

Lab 50% MEK
50 Tol

method		20% NaCl soln			in H_2O
#	1	% sol	= 100%		100%
	S.G.	.795 - Sol - Dry			
2	"	.794	100	Dry	100
3	"	.794	100	Dry	100
4	"	.793	100	"	100
5	"	.820	40%	wet	fog
6	"	.810	40%		100

Dist

1	IBP-141	70% 150	80-152	90-154	
2					95-155
3					
4					
5					
6					

Union Carbide - Charleston Lab #4

50 : 65 = x : 100

65x = 5000

x = 77

Min Sp

1	non-sol
2	"
3	"
4	"
5	" a fog

1.46

1.31

146
79
67

131
79
52

1x1 Tol Treated with NaOH soln.

TECHNICAL PRODUCTS, INC.
3500 Ridge Road
Cleveland, Ohio
WOodbine 1-3340

LABORATORY REPORT

Product:_____

Date_____ Remarks_____

ASTM Distillation	TEMP. °F	A.P.I. Gravity 60/60 °F
I.B.P.	160	Sp. Grav. 60/60 °F
5%		Lbs. Per Gal.
10%	210	Dr. Test
20%	220	Odor
30%	225	Color
40%		Corrosion
50%		
60%		Flash, Tag C.C.
70%	228	Aniline Point
80%		Mixed Aniline Point
90%		K.B. Value
95%		
E.P.		Viscosity @ °F
		Viscosity @ °F
		% Aromatics
		Unsulfonated Residue
		Miscellaneous

Signed_____

303-42

5 1/2 ¢

TECHNICAL PRODUCTS, INC.
3500 Ridge Road
Cleveland, Ohio
WOodbine 1-[illegible]

8'

LABORATORY REPORT

5

6'

Product: 6

Date Remarks

A.P.I. Gravity 60/60 °F	TEMP. °F	ASTM Distillation
Sp. Grav. 60/60 °F		I.B.P.
Lbs. per Gal.		5%
Br. No.		10%
Odor		20%
Color		30%
Corrosion		40%
		50%
Flash, Tag [illegible]		60%
Aniline Point .790 – .795		70%
Mixed Aniline Point		80%
K.B. Value .810 .815		90%
		95%
Viscosity @ °F		E.P.
Viscosity @ °F		
Aromatics		
Unsulfonated Residue		
Miscellaneous		

933-6151 — Ray Dreger

6

28292337

D
16

Signed

ROADWAY EXPRESS, INC.

"Dedicated to Better Service"

Washed TRI (4X)

(3%)

10 cc —	175
20	180
40	186
80	188
130	190
160	191
170	195

Sp. Gr. 1.44

Sol H_2SO_4 - 1%
after 24 hrs - 0%
MS 0

Better

ROADWAY EXPRESS, INC.

"Dedicated to Better Service"

Acid TR1

IBP	150
5%	
10 cc	180
20	185
40	186
100	189
120	189

Sp. Gr. 1.4/1

H_2SO_4 1%
after 24 hrs 0%
M.S. 0

Bob Cohen
Dever Chem
Charlestown W. Va

Simpson - Standard Alkali

Olin Math - Mong
Ashtabula

Chloro - Benzene
Dr Chlor

5 Gal methanol
10,000 gal month
Chlor Benz - 175 at 20 mm

160cc Glidden Elm

1 BP	145 9/7
5 %	160
33	168
50	172
65	180
75	190
90	200
EP	240

Rassos

Dry with Tol
1/2 % " M.S. (40-50)

Sp Gr. .845

~~K~~en Ditsl

1.25 — ~~8~~ 1.10

E.C. Rean
343-7797

285-2161
Barr

2 oz/gal ≈ 1 1/4 #/2.0 gal

---

1 1/2/25 gal -- 3 #/50 g - 6 #/100 g.

Figure this at 5 #/100 gal =

50 #/1000 gal ≈ 100 #/2000 g

Total react (dlk. it) probably

1 #/10 gal = 100 #/1000 g

or 200 #(1/2 D)/2000 g

try 100 # first, then dlk after dumping water

Oncedist 150-PROP

Dry mix 1 oz per gal 11.04#
= about 1 # per 25 gal
= 2 # / drum (50 gal)
= 20 # / 500 gal.
= 40 # / 1000 gal
= 80 # / 2000 gal
= 100 # / 1 bbl

2nd Trial - Double Caustic

Mix well 6, 3/4 full buckets
caustic at 70% - results 91%
IPA

Weber Island

TECHNICAL PRODUCTS, INC.
3500 Ridge Road
Cleveland, Ohio
WOodbine 1-3340

probable water azeo

LABORATORY REPORT

Product: _____

Date _____ **Remarks** _____

ASTM Distillation	TEMP. °F	A.P.I. Gravity 60/60 °F
I.B.P.	170	Sp. Grav. 60/60 °F
5% cc "		Lbs. Per Gal.
10%	200	Dr. Test
20%	220	Odor
30%	220	Color
40%		Corrosion
50%	225	
60%		Flash, Tag C.C.
70%	228	Aniline Point
80%		Mixed Aniline Point
90%	229	K.B. Value
95%		
E.P.		Viscosity @ °F
110	230	Viscosity @ °F
130	232	% Aromatics
140	237	Unsulfonated Residue
150	242	Miscellaneous
160	250	
		Sp. Gr. .855
		Di-Methyl - 100% sol

cloudy to (? H-2O) here

Signed _____

high boiler

Organisol

Cobalt 60

6 # [redacted]

TECHNICAL PRODUCTS, INC.
3500 Ridge Road
Cleveland, Ohio
Woodbine 1-3340

LABORATORY REPORT

stripped Ketone

Product:

Date Millersburg — Remarks Rt [redacted] W (39) E-1x

1/2 mi park — bottom of hill

ASTM Distillation	TEMP. °F	A.P.I. Gravity @ 60 °F	
I.B.P.		Sp. Grav. 60/60 °F	
5%		Lbs. Per Gal.	
10%		Dr. Test	
20%		Odor	
30%		Color	
40%		Corrosion	
50%			
60%		Flash, Tag C.C.	
70%		Aniline Point	
80%		Mixed Aniline Point	
90%		K.B. Value	
95%			
E.P.		Viscosity @ °F	
		Viscosity @ °F	
		% Aromatics	
		Unsulfonated Residue	
		Miscellaneous	

Signed

DEPOSITED WITH

FIRST NATIONAL BANK OF ELYRIA

ACCOUNT NUMBER

By Glidden Elmwood

Elyria, Ohio, 4/10/68 19

SEE THAT ALL CHECKS AND DRAFTS ARE ENDORSED

	DOLLARS	CENTS	THIS COLUMN FOR USE OF BANK ONLY
CURRENCY			
SILVER	.793		A [illegible]
CHECKS			
	.871		IPA 184-194
	.806		MEK 174-177
	~~25~~		.793
	~~23~~		.806
	~~50~~		.871
			~~.871~~
	10% - Acet		790
	20 - MEK		800
	70 - IPA		870
Total Deposit			

In receiving items for deposit or collection, this bank acts only as depositor's collecting agent and assumes no responsibility beyond the exercise of due care. All items are credited subject to final payment in cash or solvent credits. This bank will not be liable for default or negligence of its duly selected correspondents nor for losses in transit, and each correspondent so selected shall not be liable except for its own negligence. This bank or its correspondents may send items, directly or indirectly, to any bank including the payor, and accept its draft or credit as conditional payment in lieu of cash. It may charge back any item at any time before final payment, whether returned or not. Also any item drawn on this bank not good at close of business on day deposited.

PLEASE LIST EACH CHECK SEPARATELY
ALL CHECKS DEPOSITED ARE SUBJECT TO PAYMENT

Check American

Greetings in

Lab.

130 lbs

170 50%

220 F

20% ml H_2O

.845 Sp. Gr.

Phillips Petro Propylene Tetramer
Spec Prod Dev.

918 336 6600 B.Obla

Mr. Bud Frang
8616

26 gal

Purified olefin

C12 - C16 range

B.R. - 354-397 345 - 410
Fl Pt - >130°F
Sp Gr. - .7732

great for Byerlyte

clean just haul

Lacquer Products

62° degrees F
Flash Point

PHILLIPS PETROLEUM COMPANY
BARTLESVILLE, OKLAHOMA 74003
PHONE 918 FEDERAL 6-6600

CHEMICAL DEPARTMENT
Special Products Division

Sealand Chemical

April 10, 1968

Propylene Tetramer
HF-149-68

AIR MAIL

Mr. R. W. Obitts
Obitts Chemical Company
P. O. Box 375
Elyria, Ohio 44035

Dear Mr. Obitts:

Here is the Propylene Tetramer data you requested in our April 9 telephone conversation. You indicated a potential bulk interest for a possible down-the-line use.

Your inquiry and interest are appreciated. We will be glad to work with you on the tank car volume should your need develop.

Very truly yours,

H. Franz

HF:ow

Enc: Data Sheet

H. Franz
Manager, Package Sales
Phone: 918 336-6600
Ext. 8616

PHILLIPS PETROLEUM COMPANY
BARTLESVILLE, OKLAHOMA

SPECIAL PRODUCTS DIVISION

PROPYLENE TETRAMER

Property	Typical	Specifications Minimum	Specifications Maximum	Test Method
Distillation, F at 760 mm				ASTM D 86
IBP	354	345	355	
10%	359	350	360	
50%	364	-	-	
90%	381	380	390	
EP	397	390	410	
API Gravity, 60 F	51.5	50	52	ASTM D 287
Specific Gravity, 60/60 F	0.7732	-	-	ASTM D 1298
Bromine Number	111	105	-	ASTM D 1159
Color, APHA	20	-	50	ASTM D 1209
Sulfur, wt %	0.003	-	0.05	ASTM D 1266
Corrosion (Copper Strip)	Pass	-	-	ASTM D 130
Peroxide Number, milliequivalents/liter	Nil	-	1	Method of Wagner, Smith & Peters Anal. Chem. 19, 976 (1947)

Inhibitor - 8 lbs/1000 bbl Du Pont No. 22.

Availability: Commercially in tank cars. Current spot tank car price is $0.26/gal., f.o.b. Duncan, Oklahoma. This price is net and subject to change without notice.

August 7, 1963

F. B. P. Analysis

20 % Rubber Solvent
3 Acetone
2 MIBK
38 % Toluol
21 Xylol
4 Butt Alcohol
12 Cellosolve Acetate

5 cc - 140 degrees
50 cc - 170
75 cc - 200
100 cc. - 225
145 cc - 240

50% Toluol
5% acetone
20% ethel acetate
10% ethel alcohol
10% Lac. diluents

Acid Trichlor:
Circulate thru lime (hydrated) until neutral. Check in lab. After distillation add .015% diisopropyl amine to stablize. .1% eprichlor hydrin is used patent---antioxident.

Equivilant to - 1 ounce of diisopropyl amine per drum of trichlor and 2 ounces of epichlor hydrine.

To each comp (1/2 full) of
Trichlor-S-T tanker add
1 qt of Dimethyl Amine
1 qt of Epichlorhydrin

700 X 12 = 8400
.1% = 8.4#
01 = .85
02 = 1.0 = 1 qt per 1000 gal

Pontiac 81° } Heath
KK 88° }

Sardstown 73° - Sidney & Dayton.

DOROTHY K. DUBENA
THE OBITTS CHEMICAL COMPANY
142 LOCUST STREET, ELYRIA, OHIO 44035
323-3275

10# iso pr - 100# - 50% caustic

10" caustic - per Dal

then add 10# iso on top -

making 20# - Mr. Russell Clarke

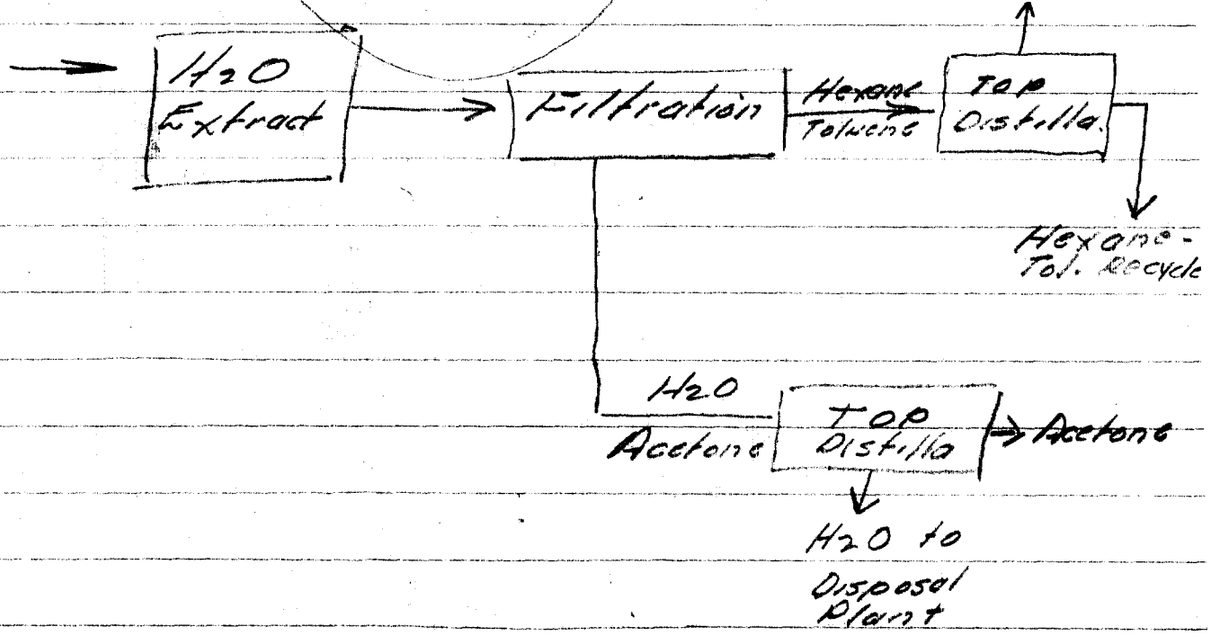
200,000 gal. 8000 gal R.R. Cars.

8-31-67

1. DHA - Mother Liquor
   a. 3 - Step Recovery System
      1. H_2O Extract Acetone (5 taps CBM w/ Hexane)
      2. Filtration to remove solids made insol. by H_2O wash.
      3. Distillation Resultant Layers
   b. Analysis of 23 8,000-gal. Cars:

	wt %
DHA Acetic Acid	14
Hexane	21
Acetone	15
Toluene	49
Acetic Acid	1

   c. Use 316 Equip.



8-31-67

2. Acetaldehyde
   a. 14 55 Drums
   b. Drum Value $125
   c. Top & Side-Bung Drums
   d. Reason for rejection:
      Traces of Paraldehyde

3. Bags still avail.
   a. Same stkd at Kanawha Storage.
   b. 10,000 in Institute Plant.

4. Acetone - Isopropanol
   a. 94 drs. on hand
   b. Can provide 1- drum sample if needed.

5. Possible sale of Sorbitol

Russ: If you cannot use, please send this paper back.

Dick

DLO

Size 1X1½X6 30 G.P.M. Peerless 7, M, C.

R.P.M. 3500 54' Hd

Mod 7606-7608

Ser# 194932

450 - Hydro Test

oil level plug ? - why this section

cooling comp in front of gland

3/16 Mr. Morelis

Female fitg on oil reservoir

Fill method?

1" - 125 #

CI

7-18-67

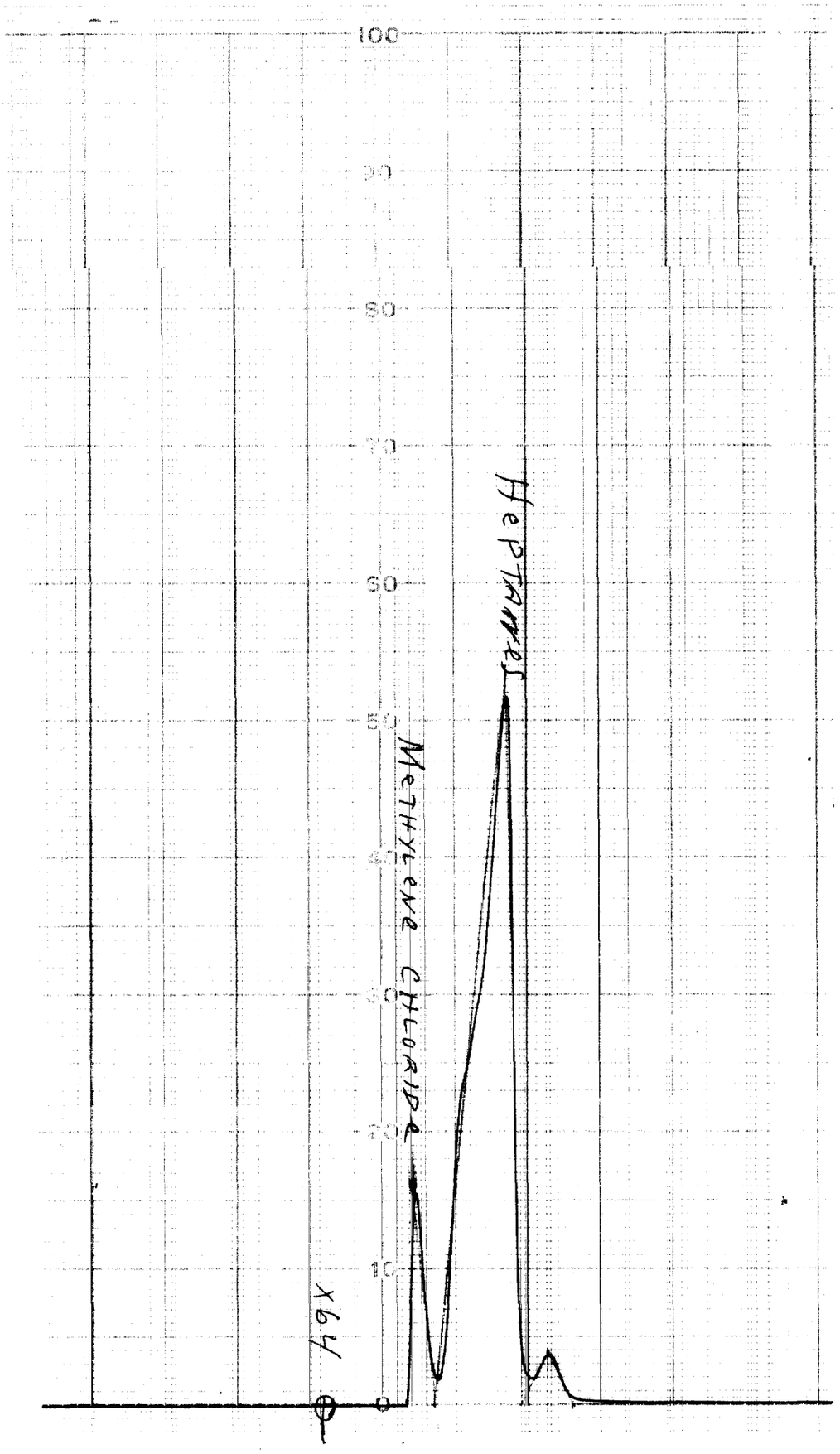
CH_2Cl_2	$36 \times 5.0 =$	180
C_7	126.3×16.0	2020.
	9.0×9.5	85.5
		2285.5

TOTAL AREA

$$\% CH_2Cl_2 = \frac{180}{2285.5} 100 = 8.\% \pm 2\%$$

A Houston

NORMAL HEPTANE SAMPLE
REC. FROM OBITTS
CHEMICAL CO. 7-14-67



NO. S-72166 E.H. SARGENT & CO.

145 = 95% tri - 5% Oil

140 = 85 " - 15 "

142 = 90 " - 10 "

Western Elec. Columbus

9/26/67

Inland Chem. Co

Toluol

IBP - 200 F

90% + yield

5% - 220

50% - 230

95 - 240 - cut

EP 255 - Throw away

Bogay can be dried $CaCl_2$

Over

Sp. Gr. .855-70

100% aromatic with
dimethyl sulfate.

IBP 170 I

500cc 250

all toluene out +

100cc (mixylol range)

160cc 290

200cc 290

250 292

350 325

355 340 - out

[redacted]

Ohio Farmers Insurance Group

Ohio Farmers Insurance Company — Chartered 1848

Superior Risk Insurance Company — LaPorte, Ohio

Colonial Heritage Life Insurance Company

new cylinder:

5 cc — 345

10 — 350 07

30 — 380 + yellow

40 — thermal decomp

smoke etc.

391-0530

221-2700

Basic Metals 9/26/67

Chlorinated solvents

1.45	①	Tri – 95%
1.40	②	Tri – 85
1.42	③	Tri – 90
1.45	④	Trifoam – 90
1.38	⑤	
1.45	⑥	Tri – 95
1.45	⑦	Tri – 95
1.38	⑧	

4,000 Heptane.

Western Elec Columbus

9/26/67

[redacted]

Ohio Farmers Insurance Group

Ohio Farmers Insurance Company — *Chartered 1848*
Superior Risk Insurance Company — *LeRoy, Ohio*
Colonial Heritage Life Insurance Company

660 = 8g = 240g épi

090 = .1 = 1½g ou 30g de

Cake repart

August

Aug. 1 - Russ - Dr Hayes 2:15

DOROTHY K. DUBENA
THE OBITTS CHEMICAL COMPANY
142 LOCUST STREET, ELYRIA, OHIO 44035
323-3275

Rec. Hexane To Firestone

Degrees	
75	.9894
74	.9901
73	.9908
72	.9915
71	.9922
70	.9929
69	.9936
68	.9944
67	.9951
66	.9958
65	.9965
64	.9972
63	.9979
62	.9986
61	.9993
60	1.0000
59	1.0007
58	1.0014
57	1.0021
56	1.0028
55	1.0035
54	1.0042
53	1.0049
52	1.0056
51	1.0063
50	1.0070

Fisher Body Pontiac.

Pont

Sp. Gr. — .860 — 60

Sol. H_2SO_4 — 20% ~~(Acet + DAE + K?)~~

IBP 150 ?

10% 190

25 - 230

50 - 260

75 - 280

90 - ~~280~~ 310

EP - ~~335~~

(Acetone, MEK
~~Butyl Cellosolve~~
Cellosolve acetate)

Non sol. in ~~DMS~~ 15%

min ~~ste~~

Sol in H_2O

F

20 – 15 — hazy → 10

B. O

15 – 24 – 21 → 16

9

NY → 25

30

Tag close cup.
15° above would represent open cup.

Ohio Farmers Insurance Group
Ohio Farmers Insurance Company — *Chartered 1848*
Superior Risk Insurance Company — *LeRoy, Ohio*
Colonial Heritage Life Insurance Company

FBL - 53
FBP - 38
M.F. - 36

1/2 — 1/2
Mr. Howland
Kappers Co.
Sidney, O.
Oper. 50
492-5566
John Curry

Sp. Gr. .8607
Tag Cl Fl Pt 48°
API 32.9

Ohio Farmers Insurance Group
Ohio Farmers Insurance Company — *Chartered 1848*
Superior Risk Insurance Company — *LeRoy, Ohio*
Colonial Heritage Life Insurance Company

Research Oil
Toluol

toluol 85 to 94 %
water 1 to 5 %
tri iso-butylene 0 to 2 %
di iso butylene 2 to 10 %

Styrene - 50 %

Toluene - 45 %

Ethyl Benzene - 5 %

million ↓

↑

ask Lucien if this was his or was it B + O,

also ask about di-acetone alcohol
Yukon

2500
12 / 30,000
24

Miller Oil Co
Toledo

.600 #

~~16~~
30
180   250

$\frac{1}{50} \times \frac{250}{1} = 5$ oz

of epi / gal

.5 cc Di-ino / gal

1300
5
6500 = 1 1/2 gal   epi / comp

650 = 1 pt

diis / comp

G - Delay KB -

clear

S - G . - . 863

IBP 190

10 220

50 230

75 231

90 232

EP 236

Acetone from B & O

cut at 138 F leaves very
little residue – 79.5% yield

acetone is dry – good smell
but fogs a little with water
must be treated (raw) with
dry caustic. Would be good
enough for Walkers' customer
(Marx toy) or Plastic or B.M. Pl.
its better stock than Chem.
Dist. acetone.

IBP 125
BP 130 135
5% 139 EP
10

Sp. Gr.
.785

Dir

Arco

(MEK)

Sol H_2SO_4 - 15%

Sp. Gr. .8607

I.B.P. 160 ℉ MEK

10% - 190

25 - 230

50 - ~~240~~

75 - 260

90 - 280

E.P. - 310

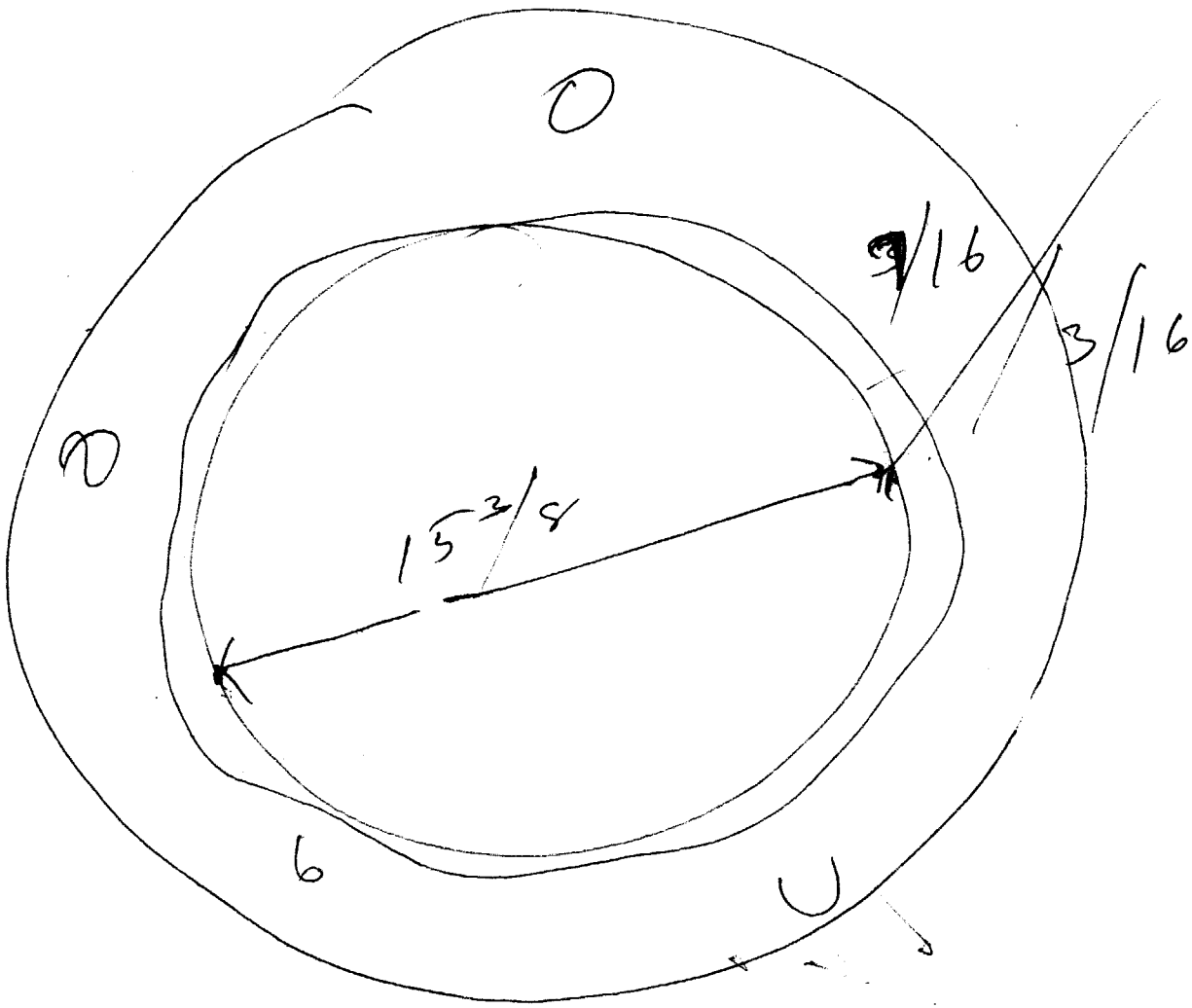
Non sol DMS - 0%

no min spts

Sol H_2O -

Maybe OK for Koppers - Sidney

Fl Pt 48 ℉ by Byerlyte


9/16
3/16
15 3/4

Employed

arco

Fl. Pt – 48

B.R. – 172 IBP

Sp. Gr. – .7167 #5
→ .8607

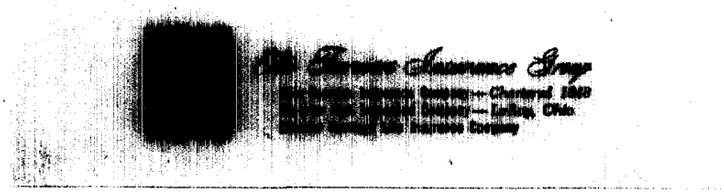
Toluol

98.2 – 90

1.75 Hexane

& light Naptha

IBP 214



Toluol - Research Oil 5/18/67

Sp. Gr. - .842 H_2SO_4 100% sol

BR. DMS - 100% sol.

IBP 200°

5% - 215

10% - 222

20% - 230

50 - 230

75 - 230

90 - 236

E.P. - 260

Eagle Rubber

Samples 6 dr. 70% Active Solvent
(Probably MIBK
Maybe MEK)

Try 1 part SS to 1 part returned material from them.

Theirs had better be filtered thru rag and funnel.

Large quantities could be pressure filtered.

Check each drum of theirs if a small shipment is to be made. (Or large shipment take average to check.)

5/11/67

Inland Chemical

Rubber Solvent.

Specific Gravity .726

Boiling Range 145°F to 260°F

Eagle

IBP H_2SO_4 - 70%

1607

10 - 170

25 - 185

50 - 210

75 - 240

80 - 260

90 - 290

EP 325

G-7. Hercane

152-156 last 5%
165

color OK

odor "

chromat- "

General Ohio Hercane

Ohio Farmers Insurance Group
Ohio Farmers Insurance Company — Chartered 1848
Superior Risk Insurance Company — LeRoy, Ohio
Colonial Heritage Life Insurance Company

3/23/67

Glidden Co - Elmwood.

Maurice Wetzel

75% I. P. A.

15% M. E. K.

10% Acetone.

KB on G. Tolual- ~~###~~

4 on RO Tolual- 114

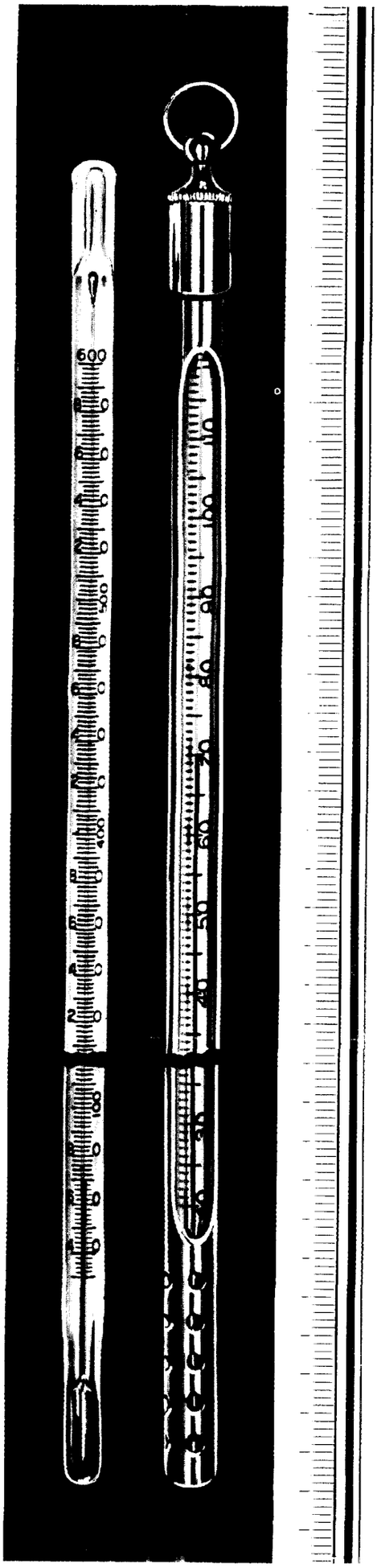
→ Color clear

API 34.5

SG .8524

7.09c

IBP	204	90 - 232
5	216	95 - 248
10	220	EP = 262
40	228	
50	"	
60	230	
70	"	
80	231	



Engraved-Stem

A.S.T.M. THERMOMETERS

the DALEN co.

WOOSTER, OHIO 44691

Main Office:- State Route 3 South, Wooster, Ohio

Area Code 216 263-4186

Sales Offices:- Cleveland, Dayton and Chicago

Main Office Tel. 216/264 9982

A. S. T. M. THERMOMETERS

Type and Range	Divisions	Immersion	Length	A.S.T.M. Desig.
PARTIAL IMMERSION				
0 to 302°F.	2°	3″	12½″	1F
20 to 580°F.	2°	3″	15¼″	2F
20 to 760°F.	2°	3″	16¼″	3F
—20 to 150°C.	1°	76 mm	322 mm	1C
—5 to 300°C.	1°	76 mm	390 mm	2C
—5 to 400°C	1°	76 mm	413 mm	3C
CLOUD AND POUR				
—112 to 70°F. (Low)	2°	3″	9″	6F
—36 to 120°F.	2°	4½″	8¾″	5F
—80 to 20°C. (Low)	1°	76 mm	229 mm	6C
—38 to 50°C.	1°	108 mm	222 mm	5C
LOW DISTILLATION				
30 to 580°F.	2°	Total	15″	7F
—2 to 300°C.	1°	Total	381 mm	7C
HIGH DISTILLATION				
30 to 760°F.	2°	Total	15″	8F
—2 to 400°C.	1°	Total	381 mm	8C
PENSKY-MARTENS				
20 to 230°F.	1°	2¼″	10¾″	9F
—5 to 110°C.	0.5°	57 mm	275 mm	9C
200 to 700°F. (High)	5°	2¼″	10¾″	10F
90 to 370°C. (High)	2°	57 mm	275 mm	10C
TAG CLOSED TESTER				
—4 to 122°F. (Low)	1°	2¼″	10¾″	57F
—20 to 50°C. (Low)	0.5°	57 mm	275 mm	57C
20 to 230°F.	1°	2¼″	10¾″	9F
—5 to 110°C.	0.5°	57 mm	275 mm	9C
OPEN FLASH				
20 to 760°F.	5°	1″	12″	11F
—6 to 400°C.	2°	25 mm	305 mm	11C
GRAVITY				
—5 to 215°F.	0.5°	Total	16″	12F
—20 to 102°C.	0.2°	Total	406 mm	12C
LOSS ON HEAT				
155 to 170°C.	0.5°	Total	152 mm	13C
PARAFFIN WAX MELTING POINT				
100 to 180°F.	0.2°	3⅛″	14½″	14F
38 to 82°C.	0.1°	79 mm	368 mm	14C
SOFTENING POINT				
30 to 180°F. (Low)	0.5°	Total	15″	15F
—2 to 80°C. (Low)	0.2°	Total	381 mm	15C
85 to 392°F. (High)	1°	Total	15″	16F
30 to 200°C. (High)	0.5°	Total	381 mm	16C
SOLVENTS DISTILLATION				
—2 to 52°C.	0.2°	100 mm	382 mm	37C
24 to 78°C.	0.2°	100 mm	382 mm	38C
48 to 102°C.	0.2°	100 mm	382 mm	39C
72 to 126°C.	0.2°	100 mm	382 mm	40C
98 to 152°C.	0.2°	100 mm	382 mm	41C
95 to 255°C.	0.5°	100 mm	382 mm	42C

Type and Range	Divisions	Immersion	Length	A.S.T.M Desig.
BOMB CALORIMETER				
66 to 95°F.	.05°	Total	24″	56F
19 to 35°C.	.02°	Total	600 mm	56C
CONGEALING POINT				
68 to 213°F.	0.5°	Total	12″	54F
BUTADIENE BOILING POINT				
—10 to 5°C.	0.1°	Total	160 mm	52C
BENZINE FREEZING POINT				
—0.6 to 10.4°C.	0.1°	Total	172 mm	53C
ASTM TANK				
—30 to 120°F.	1°	Total	12″	58F
0 to 180°F.	1°	Total	12″	59F
170 to 500°F.	2°	Total	12″	60F
0 to 120°F.	1°	Total	12″	97F
60 to 180°F.	1°	Total	12″	98F
PETROLATUM MELTING POINT				
90 to 260°F.	0.5°	3⅛″	14½″	61F
32 to 127°C.	0.2°	79 mm	368 mm	61C
ASTM PRECISION				
—36 to 35°F.	0.2°	Total	15″	62F
18 to 89°F.	0.2°	Total	15″	63F
77 to 131°F.	0.2°	Total	15″	64F
122 to 176°F.	0.2°	Total	15″	65F
167 to 221°F.	0.2°	Total	15″	66F
203 to 311°F.	0.5°	Total	15″	67F
293 to 401°F.	0.5°	Total	15″	68F
383 to 581°F.	1°	Total	15″	69F
563 to 761°F.	1°	Total	15″	70F
—38 to +2°C.	0.1°	Total	381 mm	62C
—8 to 32°C.	0.1°	Total	381 mm	63C
25 to 55°C.	0.1°	Total	381 mm	64C
50 to 80°C.	0.1°	Total	381 mm	65C
75 to 105°C.	0.1°	Total	381 mm	66C
95 to 155°C.	0.2°	Total	381 mm	67C
145 to 205°C.	0.2°	Total	381 mm	68C
195 to 305°C.	0.5°	Total	381 mm	69C
295 to 405°C.	0.5°	Total	381 mm	70C
OIL IN WAX				
—35 to 70°F.	1°	3″	14″	71F
ANTIFREEZE FREEZING POINT				
—35 to 35°F.	1°	4″	16″	75F
—65 to +5°F.	1°	4″	16″	76F
FUEL RATING, ENGINE				
0 to 220°F.	2°	1⅛″	6½″	82F
FUEL RATING, AIR				
60 to 160°F.	1°	1⅝″	6¾″	83F
FUEL RATING, ORIFICE TANK				
75 to 175°F.	1°	9⅞″	15″	84F
FUEL RATING, SURGE				
100 to 300°F.	2°	7⅛″	12″	85F
FUEL RATING, MIX				
200 to 350°F.	1°	1⅜″	6½″	86F
FUEL RATING, COOLANT				
300 to 400°F.	1°	1⅝″	6¾″	87F

A.S.T.M. THERMOMETERS

These individual thermometers conform to the detailed requirements, which are specified by The American Society for Testing Materials.

Type and Range	Divisions	Immersion	Length	A.S.T.M. Desig.
SAYBOLT VISCOSITY				
66 to 80°F.	0.2°	Total	10″	17F
94 to 108°F.	0.2°	Total	10″	18F
120 to 134°F.	0.2°	Total	10″	19F
134 to 148°F.	0.2°	Total	10″	20F
174 to 188°F.	0.2°	Total	10″	21F
204 to 218°F.	0.2°	Total	10″	22F
245 to 265°F.	0.5°	Total	10″	77F
295 to 315°F.	0.5°	Total	10″	78F
345 to 365°F.	0.5°	Total	10″	79F
395 to 415°F.	0.5°	Total	10″	80F
445 to 465°F.	0.5°	Total	10″	81F
19 to 27°C.	0.1°	Total	254 mm	17C
34 to 42°C.	0.1°	Total	254 mm	18C
49 to 57°C.	0.1°	Total	254 mm	19C
57 to 65°C.	0.1°	Total	254 mm	20C
79 to 87°C.	0.1°	Total	254 mm	21C
95 to 103°C.	0.1°	Total	254 mm	22C
ENGLER VISCOSITY				
18 to 28°C.	0.2°	90 mm	203 mm	23C
39 to 54°C.	0.2°	90 mm	228 mm	24C
95 to 105°C.	0.2°	90 mm	203 mm	25C
KINEMATIC VISCOSITY				
—61 to —29°F.	0.2°	Total	16″	43F
66.5 to 71.5°F.	0.1°	Total	12″	44F
74.5 to 79.5°F.	0.1°	Total	12″	45F
97.5 to 102.5°F.	0.1°	Total	12″	28F
119.5 to 124.5°F.	0.1°	Total	12″	46F
127.5 to 132.5°F.	0.1°	Total	12″	29F
137.5 to 142.5°F.	0.1°	Total	12″	47F
177.5 to 182.5°F.	0.1°	Total	12″	48F
207.5 to 212.5°F.	0.1°	Total	12″	30F
—2.5 to 2.5°F.	0.1°	Total	12″	72F
—42.5 to —37.5°F.	0.1°	Total	12″	73F
—67.5 to —62.5°F.	0.1°	Total	12″	74F
STORMER VISCOSITY				
20 to 70°C.	0.2°	65 mm	290 mm	49C
STABILITY OF NITROCELLULOSE				
130 to 140°C.	0.1°	Total	461 mm	26C
TURPENTINE DISTILLATION				
147 to 182°C.	0.5°	76 mm	293 mm	27C
ANILINE POINT				
—36.5 to 107.5°F.	0.5°	2″	16″	33F
77 to 221°F.	0.5°	2″	16″	34F
194 to 338°F.	0.5°	2″	16″	35F
—38 to 42°C.	0.2°	51 mm	406 mm	33C
25 to 105°C.	0.2°	51 mm	406 mm	34C
90 to 170°C.	0.2°	51 mm	406 mm	35C
TITER TEST				
—2 to 68°C.	0.2°	45 mm	387 mm	36C
GAS CALORIMETER				
54 to 101°F. (Inlet)	0.1°	Total	18″	50F
69 to 116°F. (Outlet)	0.1°	Total	18″	51F
VEGETABLE OIL FLASH				
60 to 400°F.	2°	2¼″	10″	88F
10 to 200°C.	1°	57 mm	275 mm	88C
SOLIDIFICATION POINT				
—20 to +10°C.	0.1°	76 mm	368 mm	89C
0 to 30°C.	0.1°	76 mm	368 mm	90C
20 to 50°C.	0.1°	76 mm	368 mm	91C
40 to 70°C.	0.1°	76 mm	368 mm	92C
60 to 90°C.	0.1°	76 mm	368 mm	93C
80 to 110°C.	0.1°	76 mm	368 mm	94C
100 to 130°C.	0.1°	76 mm	368 mm	95C
120 to 150°C.	0.1°	76 mm	368 mm	96C
145 to 205°C.	0.2°	76 mm	370 mm	100C
195 to 305°C.	0.5°	76 mm	370 mm	101C
WEATHERING TEST				
—55 to +40°F.	0.5°	1″	12″	99F

LABORATORY WHITE-BACK THERMOMETERS

Range	Division	Immersion	Length
—30 to 120°F.	1°	Total	12″
0 to 220°F.	2°	Total	12″
0 to 300°F.	2°	Total	12″
20 to 400°F.	2°	Total	12″
20 to 600°F.	2°	Total	15″
20 to 760°F.	2°	Total	16″
—30 to 120°F.	1°	3″	12″
0 to 220°F.	2°	3″	12″
0 to 300°F.	2°	3″	12″
20 to 400°F.	2°	3″	14″
20 to 600°F.	2°	3″	15″
20 to 760°F.	2°	3″	16″
20 to 940°F.	2°	3″	16″
—10 to 110°C.	1°	Total	305 mm
—10 to 150°C.	1°	Total	305 mm
—5 to 200°C.	1°	Total	305 mm
—5 to 250°C.	1°	Total	356 mm
—5 to 300°C.	1°	Total	381 mm
—5 to 360°C.	1°	Total	406 mm
—5 to 400°C.	1°	Total	406 mm
—10 to 110°C.	1°	76 mm	305 mm
—10 to 150°C.	1°	76 mm	305 mm
—5 to 200°C.	1°	76 mm	356 mm
—5 to 300°C	1°	76 mm	381 mm
—5 to 400°C.	1°	76 mm	406 mm
—10 to 500°C.	2°	76 mm	406 mm

LOW-TEMPERATURE THERMOMETERS

Range	Division	Immersion	Length
—50 to 50°C.	1°	Total	305 mm
—100 to 50°C.	1°	Total	305 mm
—200 to 50°C.	1°	Total	381 mm

DOUBLE SCALE — BOTH FAHRENHEIT and CENTIGRADE RANGES

Range	Division	Immersion	Length
0 to 220°F.	2°	Total	12″
—10 to 110°C.	1°		
30 to 300°F.	2°	Total	12″
—10 to 150°C.	1°		
30 to 400°F.	2°	Total	14″
—5 to 200°C.	1°		
20 to 680°F.	2°	Total	15″
—5 to 360°C.	1°		

GENERAL-TEST THERMOMETERS

All-purpose quality thermometers, carefully manufactured from start to finish for general laboratory and industrial testing. Mercury-filled, easy to read, and accurate.

Range	*Divisions*	*Length*	*Immersion*
—40 to 120° F.	1°	12″	Total
0 to 120° F.	1°	12″	Total
0 to 120° F.	½°	12″	Total
0 to 220° F.	1°	12″	Total
0 to 300° F.	1°	12″	Total
30 to 400° F.	2°	12″	Total
0 to 220° F.	1°	15″	Total
0 to 300° F.	1°	15″	Total
30 to 400° F.	1°	15″	Total
30 to 500° F.	2°	15″	Total
30 to 600° F.	2°	15″	Total
30 to 760° F.	2°	15″	Total
30 to 1000° F.	5°	16″	Total
30 to 1200° F.	5°	16″	Total
—40 to 120° F.	1°	12″	3″
0 to 120° F.	1°	12″	3″
0 to 220° F.	1°	12″	3″
0 to 300° F.	2°	12″	3″
30 to 400° F.	2°	12″	3″
0 to 220° F.	1°	15″	3″
0 to 300° F.	1°	15″	3″
30 to 400° F.	1°	15″	3″
30 to 500° F.	2°	15″	3″
30 to 600° F.	2°	15″	3″
30 to 760° F.	2°	16″	3″
30 to 1000° F.	5°	16″	3″
30 to 1200° F.	5°	16″	3″
—40 to 50° C.	½°	305 mm.	Total
—20 to 50° C.	½°	305 mm.	Total
—20 to 105° C.	1°	305 mm.	Total
—20 to 150° C.	1°	305 mm.	Total
—1 to 200° C.	1°	305 mm.	Total
—20 to 105° C.	½°	381 mm.	Total
—20 to 150° C.	½°	381 mm.	Total
—1 to 200° C.	½°	381 mm.	Total
—1 to 260° C.	1°	381 mm.	Total
—1 to 315° C.	1°	381 mm.	Total
—1 to 400° C.	1°	406 mm.	Total
—1 to 540° C.	2°	406 mm.	Total
—1 to 650° C.	2°	406 mm.	Total
—40 to 50° C.	½°	305 mm.	76 mm.
—20 to 50° C.	½°	305 mm.	76 mm.
—20 to 105° C.	1°	305 mm.	76 mm.
—20 to 150° C.	1°	305 mm.	76 mm.
—1 to 200° C.	1°	305 mm.	76 mm.
—20 to 105° C.	½°	381 mm.	76 mm.
—20 to 150° C.	½°	381 mm.	76 mm.
—1 to 200° C.	½°	381 mm.	76 mm.
—1 to 260° C.	1°	381 mm.	76 mm.
—1 to 315° C.	1°	381 mm.	76 mm.
—1 to 400° C.	1°	406 mm.	76 mm.
—1 to 540° C.	2°	406 mm.	76 mm.
—1 to 650° C.	2°	406 mm.	76 mm.

PRECISION-TEST THERMOMETERS

The finest grade thermometers that can be made. Engraved stem, gas filled above mercury column for sustained accuracy. These **BE-LINE** flat bore thermometers are guaranteed accurate within one-half division and comply with all specifications of the National Bureau of Standards. A certificate of the National Bureau of Standards or our factory certificate will be furnished upon request at the usual fee.

Range	*Divisions*	*Immersion*	*Length*
—30 to 30°C.	1/10°	Total	406 mm.
—1 to 50°C.	1/10°	Total	406 mm.
50 to 100°C.	1/10°	Total	406 mm.
—1 to 100°C.	1/5°	Total	406 mm.
100 to 200°C.	1/5°	Total	406 mm.
—1 to 200°C.	½°	Total	406 mm.
200 to 300°C.	1/5°	Total	406 mm.
200 to 360°C.	½°	Total	406 mm.
—1 to 100°C.	1/10°	Total	610 mm.
—1 to 200°C.	1/5°	Total	610 mm.
200 to 300°C.	1/5°	Total	610 mm.
200 to 360°C.	1/5°	Total	610 mm.

6″ MAXIMUM-REGISTERING POCKET THERMOMETERS

BE-LINE flat bore, engraved-stem pocket thermometers similar to above in high quality of manufacture, accuracy, and convenience, but designed for use where maximum temperature reading is required. Attractive, durable pocket case.

Complete			*Refill Only*
Cat. Number	*Range*	*Divisions*	*Cat. Number*
A-410C	30 to 120°F.	1°	A-415
A-411C	30 to 220°F.	2°	A-416
A-412C	30 to 400°F.	5°	A-417

7″ ARMORED THERMOMETERS

Sturdy **BE-LINE** flat bore thermometers for general testing where space is limited. Chrome-plated brass armor for strength, open-face for reading clarity, perforated base for accuracy and reduction of time lag.

Complete			*Refill Only*
Cat. Number	*Range*	*Divisions*	*Cat. Number*
A-450C	—30 to 120°F.	2°	A-455
A-451C	30 to 120°F.	1°	A-456
A-452C	0 to 220°F.	2°	A-457

6″ DOUBLE ARMOR POCKET THERMOMETERS

The same fine quality **BE-LINE** flat bore thermometers as above, but armored for protection while in use. Open-face armor and perforated bulb guard to minimize time lag and assure accurate readings. The rugged pocket case gives double protection when thermometer is not in use.

Complete			*Refill Only*
Cat Number	*Range*	*Divisions*	*Cat. Number*
A-420C	—30 to 120°F.	2°	A-425
A-421C	30 to 120°F.	1°	A-426
A-422C	0 to 220°F.	2°	A-427

6″ POCKET THERMOMETERS

Convenience and accuracy are features of these **BE-LINE** flat bore, engraved-stem pocket thermometers for temperature tests. Convenient to carry, handy to use, easy to read. Sturdy pocket cases of brass, chrome-plated. Ideal for engineers, appliance service men, etc.

Complete			*Refill Only*
Cat. Number	*Range*	*Divisions*	*Cat. Number*
A-400C	—30 to 120°F.	2°	A-405
A-401C	30 to 120°F.	1°	A-406
A-402C	0 to 220°F.	2°	A-407

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LABORATORY REPORT

PRODUCT: S.S. - Otis Chem. Co.

DATE 3/23 REMARKS

170

ASTM Distillation		TEMP. °F	A. P. I. Gravity 60/60 °F
I. B. P.	160	156	Sp. Grav. 60/60 °F .811
5%	170	160	Lbs. Per Gal.
10%	172	162	Dr. Test
20%	174	166	Odor
30%	175	168	Color
40%	176	174	Corrosion
50%		176	
60%	177	178	Flash, Tag C.C.
70%	178	180	Aniline Point
80%	180	184	Mixed Aniline Point
90%	184	198	K. B. Value
95%	190-5	220	
E. P.	~~230~~	228	Viscosity @ °F
			Viscosity @ °F
			% Aromatics
			Unsulfonated Residue
			Miscellaneous Dry with 19 pts of M.S.

This → will be E.P. of Product from plant production

SIGNED

[redacted] Webco Inc. 8200 Bessemer Ave.
Cleve. Ohio 44127

Gravity	41.3	Color Opaque	
Viscosity Say Bolt 100°	32 Sec.	Initial Boiling Point	200°
Closed Cup Flash Point	64°	10%	232°
Carbon	156°	50%	356°
BSW	0°	60%	468°
Pour Point	-10°	90%	560°
Sulfur	.05°	End Point	596°
		97% Recovery	

Wm A. & Co Webco

Webco, Inc.
~~XXXXXXXXXXXXXXXXX~~
~~22600 LAKELAND BLVD.~~
CLEVELAND, OHIO ~~44132~~ XXXXX

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